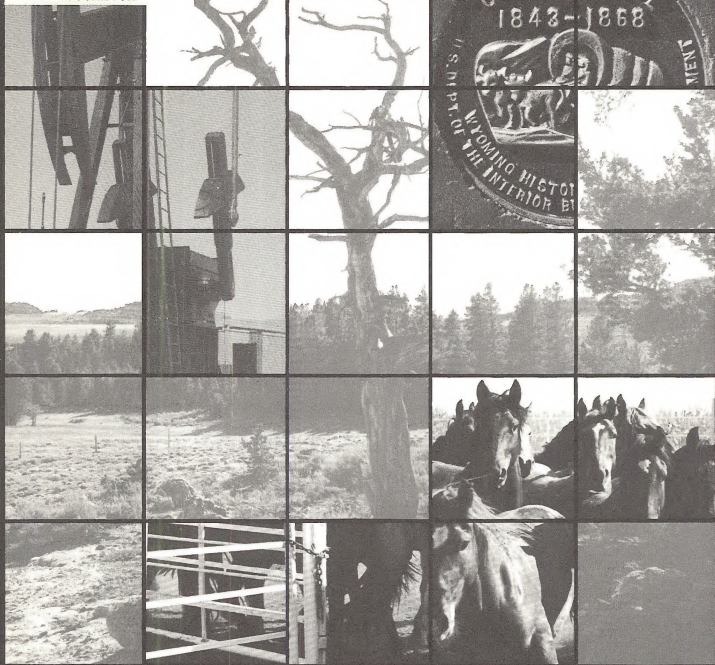




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# LANDER

Resource Management Plan  
Draft Environmental Impact Statement

**DRAFT**  
**Resource Management Plan/  
Environmental Impact Statement  
for the Lander Resource Area**

Portions of Fremont, Natrona, Carbon, Sweetwater, and Hot Springs counties,  
Wyoming

**Lead Agency:** U.S. Department of the Interior, Bureau of Land Management

**Type of Action:** Administrative

**Abstract**

This draft resource management plan/environmental impact statement (RMP/EIS) presents and analyzes four alternatives for managing approximately 2.5 million acres in central Wyoming administered by the Lander Resource Area, Bureau of Land Management. The alternatives focus on resolving resource management issues concerning grazing, mineral development, landownership adjustment, forestry, wilderness, wildlife habitat management, and recreation and cultural resources. The draft RMP focuses on allocating resources among the uses and prescribing general management actions that would be taken. The draft EIS focuses on the various impacts that would be expected from implementing each of the alternatives. For further information regarding this RMP/EIS, contact:

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Bureau of Land Management  
Lander Resource Area  
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or

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# United States Department of the Interior

Bureau of Land Management  
Wyoming State Office  
P.O. Box 1828  
Cheyenne, Wyoming 82003

Dear Reader:

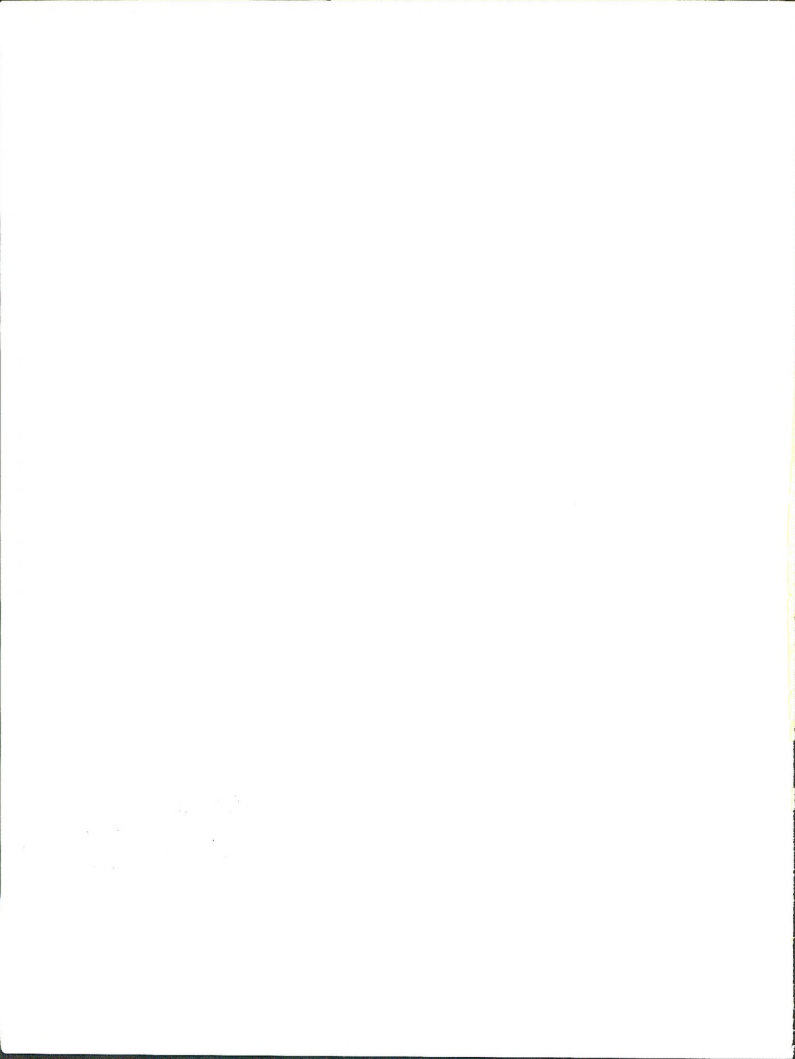
Enclosed for your review and comment is the Draft Resource Management Plan/Environmental Impact Statement (RMP/EIS) for the Lander Resource Area. This document describes and analyzes four alternatives for managing the public land resources in this area. These alternatives are designed to resolve land management issues that were identified in the early stages of the planning process. The environmental consequences of the alternatives have also been analyzed.

Your comments are invited on the alternatives presented and on the adequacy of the impact analysis. Please direct your written comments to Jack Kelly, Lander Resource Area Manager, P.O. Box 589, Lander, Wyoming 82520. Beginning with the date the Environmental Protection Agency (EPA) publishes the filing of this draft document in the Federal Register, you will have 90 days to submit your comments.

Comments on the alternatives and on the adequacy of the impact analyses will be fully considered and evaluated. These comments will be used to modify the draft and to develop the final RMP/EIS. Through your participation in this effort, we can move forward together toward a common goal of improved public land management in the Lander Resource Area.

Sincerely,

State Director



# 13769611

ID 88622182

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**DRAFT**  
**RESOURCE MANAGEMENT PLAN/  
ENVIRONMENTAL IMPACT STATEMENT**  
**for the**  
**Lander Resource Area**  
**Lander, Wyoming**

Prepared by:  
U.S. Department of the Interior  
Bureau of Land Management  
1985

  
\_\_\_\_\_  
Wyoming State Director

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# SUMMARY

## INTRODUCTION

This draft Lander Resource Management Plan (RMP) and Draft Environmental Impact Statement (DEIS) addresses future management options for approximately 2.5 million surface acres and 2.7 million acres of federal mineral estate administered by the Bureau of Land Management (BLM) through its Lander Resource Area office in Lander, Wyoming. The Lander Resource Area encompasses public lands in parts of five counties in west-central Wyoming (most of Fremont, and small portions of Natrona, Sweetwater, Carbon, and Hot Springs counties) but does not include lands managed by the U.S. Forest Service or the Bureau of Indian Affairs.

When completed, the Lander RMP will provide a comprehensive framework for managing and allocating public land and resource uses in the resource area. The draft RMP focuses on allocating resources among the uses and prescribing general management actions that would be taken. The draft EIS focuses on the various impacts that would be expected from implementing each of these alternatives addressing the issues of: oil and gas leasing and development; locatable minerals exploration and development; grazing allotment and wildlife habitat management; wilderness study recommendations; forest management; landownership adjustments and utility corridors; recreation management, including off-road vehicle (ORV) management; cultural and natural history resource protection and management; and fire management.

Four alternatives are presented in this document. Alternative A is the no action alternative and represents continuation of present management. Alternatives B and C both deal with resource protection and resource production. The difference between the two alternatives is that Alternative C requires more intensity of management and, therefore, costs more. Alternative D is the Preferred Alternative. It incorporates sections from alternatives A, B and C to present what BLM management believes represents the most balanced approach to resource protection and production.

## ALTERNATIVES

Alternatives A, B, C, and D are all multiple-use oriented. During the analysis, each alternative was approached as a separate and complete multiple-

use plan. Therefore, each alternative offers resource production and environmental protection measures. Cumulatively, the differences among the alternatives are not great; there is no one alternative that is totally oriented toward oil and gas production, nor is there one alternative that is totally oriented toward nondevelopment or protection of a particular resource over another. All of these alternatives deal with every resource from a multiple-use approach. The data for developing these alternatives is available at the Lander Resource Area office.

Alternative A, No Action, is a continuation of present management, based on existing land-use plans. Additional alternatives to current management were developed because of changing resource conditions and a need to modify the existing plans.

Alternative B considers options to Alternative A for all resources. More mineral development would be allowed than under Alternative A, but protection of other resources would be accomplished through additional restrictions on this development.

Alternative C would allow more mineral development than Alternative B. However, in order to protect other resources, management would be more intensive for nonmineral resources in order to offset impacts from mineral development.

Alternative D, the Preferred Alternative, is a combination of the other alternatives.

For a detailed description of each action and impact to the resources in each alternative, see Chapter II.

## ENVIRONMENTAL CONSEQUENCES

The alternatives considered in this RMP would affect wildlife habitat, oil and gas management, cultural resources, forest management, wilderness, and livestock grazing.

Cumulative impacts on these resources do not vary significantly from alternative to alternative. However, site-specific impacts by resource do vary among the alternatives (see table 2-2). This is because different alternatives propose different actions in different areas. Any one of these alternatives could have been selected as the preferred alternative.

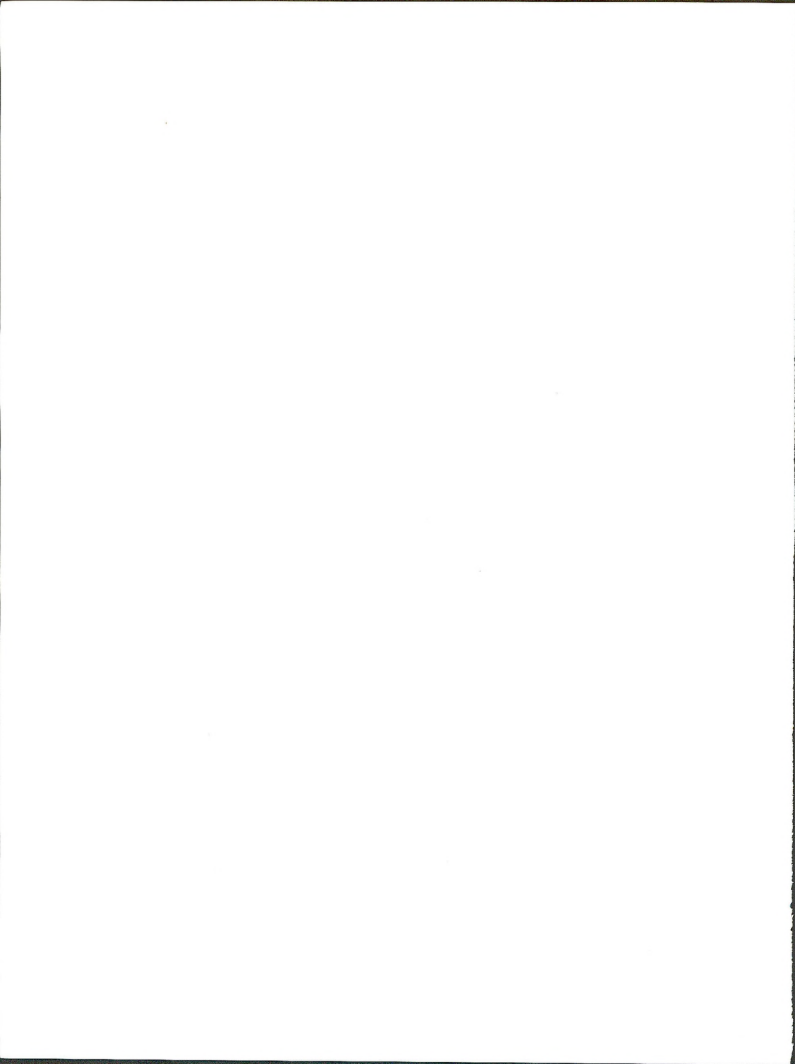
The preferred alternative incorporates selected portions of the other three alternatives.



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# CHAPTER I

## INTRODUCTION

### PURPOSE AND NEED

The Lander Resource Management Plan (RMP) has been prepared for one fundamental purpose: to provide a comprehensive framework for managing public lands and resources in the Lander Resource Area. This document describes four alternative RMPs, which prescribe ways of allocating the resources and land uses and identifies management actions that would be taken on 2.5 million acres of federal land surface and 2.7 million acres of federal mineral estate. In addition, this document contains a draft environmental impact statement on these alternatives.

These four alternatives or plans focus on the resolution of issues that involve the development and management of mineral resources, livestock grazing, habitat for wildlife, recreation, cultural and natural history resources, forest resources, access to public lands and its resources, and fire management. These alternatives also identify public lands that would be retained in public ownership and lands that could be considered for disposal through sale or exchange.

As required by section 603 of the Federal Land Policy and Management Act (FLPMA), these alternatives contain preliminary recommendations for the suitability of six wilderness study areas (WSAs): four in the Sweetwater Rocks area, one in the Copper Mountain area, and one in the Sweetwater River Canyon. The Bureau of Land Management (BLM) will make preliminary recommendations as to whether a WSA is suitable or unsuitable for inclusion in the National Wilderness Preservation System. These recommendations will be reported to Congress through the Director of BLM, the Secretary of Interior, and the President. Final suitable or unsuitable determinations for the WSAs can only be made by Congress.

The purpose of a rangeland management program for public lands is to provide guidelines for managing rangeland resources and related ecosystems, including air, soil, water, vegetation, wildlife and fisheries habitat, wild horses, and livestock. A program is needed to enable BLM to properly manage the public land and resources under its jurisdiction; stabilize the livestock industry dependent on public land; and provide

for orderly use, improvement, development and reclamation of public lands for livestock grazing, consistent with multiple-use management objectives for these lands. The responsibility and authority evolves from a series of legal and judicial mandates, including the Taylor Grazing Act of 1934 (43 USC 315-315r), the Classification and Multiple-Use Act of 1964 (Public Law 88-6071), the National Environmental Policy Act of 1969 (Public Law 91-190), the Federal Land Policy and Management Act of 1976 (Public Law 94-579), the Public Rangelands Improvement Act of 1978 (Public Law 95-514), and the 1974 federal court action on the Natural Resources Defense Council et al. versus Morton et al.

### ALTERNATIVE FORMULATION AND THE PROCESS USED TO DEVELOP THE PREFERRED ALTERNATIVE/PREFERRED PLAN

Both the National Environmental Policy Act (NEPA) and the BLM resource management planning regulations require consideration of a range of alternatives. The basic goal in formulating RMP alternatives was to identify various combinations of public land uses and resource management practices that responded to the planning issues. The alternatives presented in this chapter represent combinations of actions to guide land-use activities and resource management in the Lander Resource Area.

There are four alternatives presented in this document. One alternative, Alternative A, is the no action alternative. This means there would be a continuation of present management. The other three alternatives provide a range of choices offering various options, ranging from an emphasis on resource conservation to an emphasis on production. The preferred alternative is a combination of Alternatives A, B and C.

Alternative A, present management, served as the foundation for formulating the other

## Introduction

alternatives. During the development of the management situation analysis (see Chapter 1, Planning Process), all existing land-use decisions for the Lander Resource Area were compiled into one alternative, Alternative A. The effects of Alternative A were then analyzed to determine if there were other options to the way the resource area was being managed. Through this analysis, it was shown that there were different options for different parts of the resource area.

Because of these differences, it was convenient to portray present management and the options to present management by geographic area or management unit. All together, 13 management units were identified, including the wilderness study areas (the section in this chapter, Planning Process Overview, lists the management units).

Once present management was portrayed by management unit and all the reasonable options to present management were identified for each management unit (see Appendix 1), those options were incorporated into two additional alternative plans for the resource area (alternatives B and C).

Alternatives A (no action, continuation of present management), B and C were then analyzed to identify any significant impacts they might cause and to determine how effective they might be at issue resolution. Following this analysis and the consideration of multiple-use tradeoffs, the preferred alternative or plan was developed by choosing among the various options within alternatives A, B and C.

The preferred alternative was then analyzed to see if it would change any of the previously identified impacts. It did not. Following that analysis, a cumulative analysis was made to see if the cumulative impacts of the preferred alternative would be less than those caused by alternatives A, B or C (see Chapter IV). They were.

## DESCRIPTION OF THE LANDER RESOURCE AREA

The Lander Resource Area encompasses 6.6 million acres located in central Wyoming (see map 1-1). The resource area includes most of Fremont County; the southwest corner of Natrona County; and small portions of Carbon, Sweetwater, and Hot Springs counties. The northern boundary of the area is essentially the north Fremont County line; the west boundary is the continental divide in the Wind River Range; the southern boundary is essentially the south Fremont County line; and

the east boundary is formed by the BLM Casper District boundary line.

Of these 6.6 million acres, approximately 2.5 million (35 percent) are public lands managed by BLM and are concentrated primarily in the southern and eastern half of the resource area. The remainder of the federal land in the area is divided among the Bureau of Reclamation, 290,000 acres, and the Shoshone National Forest, 850,000 acres. Of the nonfederal land, 2 million acres are within the Wind River Indian Reservation; 700,000 acres are privately owned; and 300,000 acres are owned by the state of Wyoming (see map 1-2).

The population within the area is estimated to be between 35,000 and 40,000 people. Most reside in the several communities within the area, including Lander, Hudson, Riverton, Dubois, Shoshoni, Lysite, Moneta, Jeffrey City, South Pass City, and Atlantic City. The remainder reside in the rural areas outside these communities. The primary industries include mineral exploration and development, agriculture, and recreation.

## PLANNING PROCESS OVERVIEW

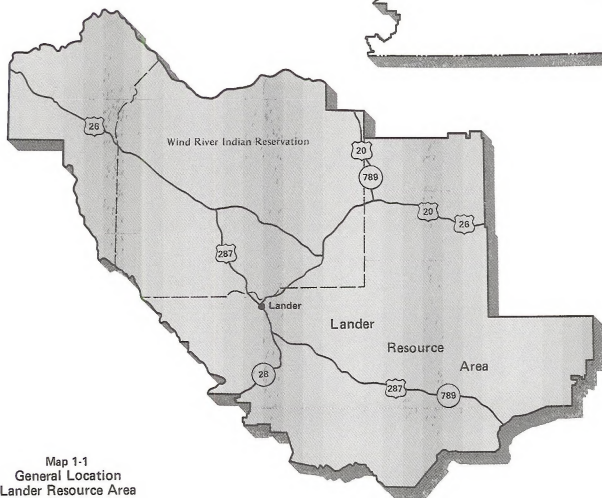
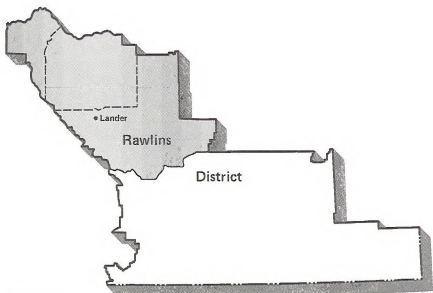
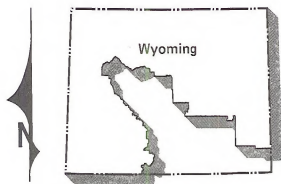
### Planning Philosophy

Implementation of the BLM planning system is based on national and state-level guidance, including the interpretations provided by regulations, manuals, and various instruction memorandums issued by the Department of the Interior and the BLM. Court orders and legislative mandates also provide guidance and generally establish the schedules involved in the planning processes.

The activity planning phase is initiated after a final RMP is selected. During activity planning, guidance provided by the resource management plan is applied to site-specific local resource needs through such things as allotment management plans, habitat management plans, use authorizations, and similar activity plans.

### Planning Strategy

We have addressed a variety of resource management questions, conflicts, and needs in this RMP.



Map 1-1  
General Location  
Lander Resource Area



## Introduction

This plan will be continually monitored for effectiveness to identify any need for amendment or revisions. Generally, when the consequences of implementing the alternatives are addressed in this document, the "short term" refers to less than 10 years; the "long term" is 10 years or more.

The BLM resource management planning process consists of nine steps and requires the use of an interdisciplinary team for the completion of each step. In addition, public involvement is an integral part of the entire process. The planning steps described in the regulations (43 CFR 1600) and used in preparing this plan are described below and are graphically summarized in figure I-1.

### Step 1: Identification of Issues

Step 1 is intended to identify resource management problems, conflicts, or opportunities in the Lander Resource Area that can be resolved through the planning process. The public, other federal agencies, and state and local governments were used to identify public land management issues. During this step for the Lander Resource Area, a newsletter was published and public meetings were held. All issues were assessed, and those considered further were consolidated into issues. These issues are presented at the end of this chapter.

### Step 2: Development of Planning Criteria

Step 2 involves development of criteria to identify the standards, guidelines, and constraints that would apply to each issue throughout the planning process. In the Lander Resource Area, the original issues and their related criteria were published in a newsletter and distributed to individuals on the RMP mailing list. The public also was encouraged to comment at the public meetings. Criteria were revised as the issues were consolidated.

### Step 3: Inventory Data and Information Collection

Step 3 allows for the collection of various kinds of issue-related resource, environmental, social, and economic data.

### Step 4: Analysis of the Management Situation

In step 4, the current situation is analyzed, public demand is assessed, and the capability of the resource area to respond to the issues is evaluated. In the Lander Resource Area, 13 separate areas, called management units, were identified where specific management or dominant resource uses now occur or could occur in the future. Each management unit was analyzed in terms of the issues, the data available, and the ability of the resources to meet future demands. Various management options were explored that addressed issues in each management unit. This analysis, an intermediate stage in the planning process, is the basis for formulating the alternatives for the draft resource management plan.

### Step 5: Formulation of Alternatives

Options identified in step 4 provide the basis for the alternatives formulated in step 5. For the Lander Resource Area, a range of alternatives was studied to address each program. Alternatives A, B, C, and D are all multiple-use oriented. During the analysis, each alternative was approached as a separate and complete multiple-use plan. Therefore, each alternative offers resource production and protection of resources. The differences among the alternatives are not great; there is no one alternative that is totally oriented toward oil and gas production, nor is there one alternative that is totally oriented toward nondevelopment or protection of a particular resource over another. All of these alternatives deal with every resource from a multiple-use approach. The data for developing these alternatives is available at the Lander Resource Area office. The fourth alternative is the preferred alternative and is a combination of alternatives A, B and C.

### Step 6: Analysis of Effects of Alternatives

In step 6, the physical, biological, social, and economic effects of implementing each alternative are assessed. This step is the environmental impact analysis required by NEPA. This analysis for the Lander Resource Area is presented in chapter 4.



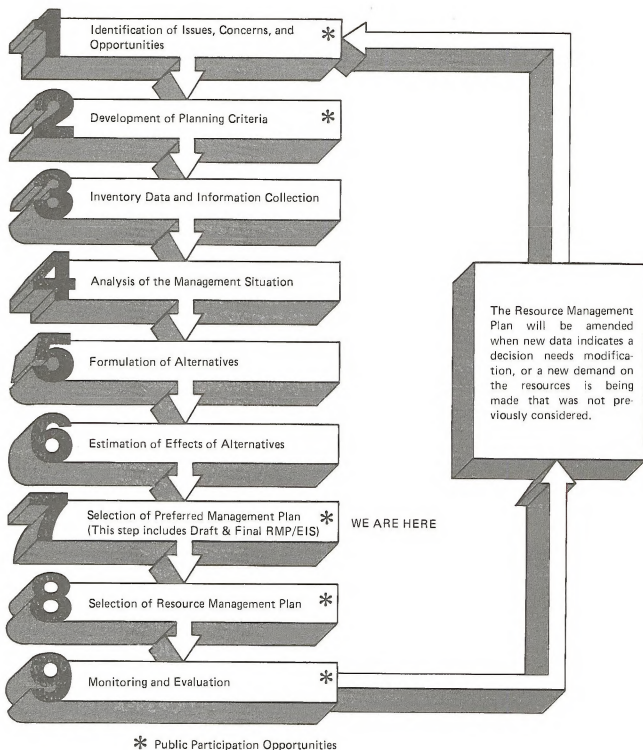


Figure 1-1  
Steps in the Resource Management  
Planning Process

### Step 7: Selection of the Preferred Management Plan

Selection of the preferred management plan (step 7) in the Lander Resource Area was based on public input and coordination, current BLM management policies and directions, and analysis of the impacts of each alternative. The preferred management plan (Alternative D) was developed by selecting elements of alternatives A, B and C.

The preferred plan is detailed in chapter 5 and the rationale for selection of each element is explained.

After BLM's Wyoming state director approves the preferred management plan, the draft plan and draft EIS will be completed and released for public review and comment for 90 days. The comment period will begin when the Environmental Protection Agency's notice of filing of the Draft RMP/EIS is published in the Federal Register.

### Step 8: Selection of the Resource Management Plan

Step 8 involves selecting the proposed resource management plan on the basis of the results of public review and comment. The district manager, Rawlins District, will recommend a proposed resource management plan and, with the approval of the BLM's Wyoming state director, it will be published along with the final EIS. After publication, a 30-day protest period on the proposed RMP/Final EIS is provided. Only persons who participated in the planning process and could be adversely affected by the plan may protest.

The state director will approve the plan no earlier than 30 days after publishing the RMP/EIS.

### Step 9: Monitoring and Evaluation

Step 9 involves monitoring the selected plan after it is implemented and evaluating the results. Data on long-term trends and resource conditions will be collected and analyzed so that the effectiveness of the plan can be determined. Monitoring the Lander Resource Area will be carried out from the time the plan is implemented until changing conditions require a revision of the plan or any portion of it.

## PLANNING ISSUES AND PLANNING CRITERIA

### Introduction

The BLM planning regulations generally equate land-use planning with resolution of issues over the use and management of public lands and resources. An issue can be defined as an opportunity not being pursued, a conflict or problem not being resolved, or a value being lost. Obviously, all issues are not resource management related and, therefore, cannot be resolved through a resource management plan. These must be resolved administratively. Issues within resource-use programs such as livestock grazing and wildlife habitat management will require more detailed, site-specific planning and analysis (i.e. activity planning) after the RMP has been completed. In cases like these, the RMP establishes methods and procedures for future management actions as opposed to making specific land-use decisions. It is usually these site-specific activity plans, rather than the RMP, that result in on-the-ground implementation of resource and land use management actions.

### Issues

The issues identified during the scoping process are:

#### Grazing Management

This issue addresses the management of livestock grazing, wildlife habitat and wild horses in the Lander Resource Area.

#### Green Mountain Grazing EIS Area

Prior to preparation of the Green Mountain Grazing EIS, a scoping process was conducted to identify significant issues. Based on contacts with organizations, individuals, and federal, state, and local agencies, areas of concern and controversy were identified. Of considerable concern was competition for forage among livestock, wild horses, and wildlife. Apprehensions were expressed about adjustments in livestock

## Introduction

numbers based on the forage allocation process. Categorization of allotments into Improve (I), Maintain (M), and Custodial (C) categories concerned some people. Solutions to overuse of the range through changes in seasons-of-use, fences, water developments, sagebrush control, and soil erosion control were discussed. Trespass by livestock and removal of wild horses were issues also. Road improvement was considered important. Another concern was the preservation of historical objects. Land being taken out of forage production because of other uses worried some people. Conflicts between ranchers and the general public (trespassing, littering, gates left open, access to public lands, etc.) were an additional concern. These issues were resolved in the Green Mountain EIS completed in 1982.

### Gas Hills Grazing EIS Area

A major concern of the grazing management issue in the Gas Hills Grazing EIS area is whether present grazing management practices on public rangelands are satisfactory to protect, improve and maintain the basic natural resources (soils, vegetation, and water) or whether changes in management are necessary. The alternatives identified in the RMP must answer the following questions for this issue.

1. What grazing allotments can be identified as having satisfactory range conditions and grazing management, are currently producing near their moderate to high resource production potential, have no serious resource-use conflicts, and may have opportunities for positive economic return from public investments?
2. What grazing allotments can be identified as having unsatisfactory range conditions and grazing management, are currently producing below their moderate to high resource production potential, have serious resource-use conflicts, and have opportunities for positive economic return from public investments?
3. What grazing allotments can be identified where federal investment is not feasible because of a lack of potential for economic return on public investment and have no critical resource conflicts?
4. What management actions can be implemented on grazing allotments presently in satisfactory condition to maintain the vegetative resource, minimize soil erosion, protect the watershed, and maintain wildlife habitat conditions?
5. What management actions can be implemented on grazing allotments presently in unsatisfactory condition to improve the vegetative resource, enhance livestock forage, reduce soil erosion, improve watershed conditions, and improve wildlife habitat?
6. What management actions can be implemented on grazing allotments where federal investment is not feasible and that have no critical resource conflicts?
7. Which grazing allotments contain significant aquatic and riparian habitats on public lands that will require special management attention through monitoring and development and implementation of allotment management plans or habitat management plans to establish and maintain satisfactory habitat conditions?
8. Which grazing allotments contain crucial or important upland wildlife habitats (i.e., winter range, fawning areas, nesting or breeding areas, threatened and endangered species habitats, etc.) that will require special management attention?
9. What areas are uneconomical to manage as full suppression for fire management and should be considered for limited suppression fire management that would in turn, benefit livestock forage production and improve wildlife habitat?

Planning criteria for the grazing management program were developed principally from provisions in the Taylor Grazing Act of 1934, which authorizes BLM to administer and control livestock grazing; the Federal Land Policy and Management Act of 1976, which requires that the lands be managed for multiple use and sustained yield; and the Public Rangelands Improvement Act, which reinforces the multiple-use concept of public land management and authorizes an intensive management program to improve the condition of the public rangelands. The Wild, Free-Roaming Horse and Burro Act of 1971 directs BLM to protect wild horses and burros from illegal capture, branding, harassment, or death.

### Oil and Gas Leasing and Development

In the Lander Resource Area, this issue is one of balancing development of oil and gas resources with the use and protection of other resource values. The Lander Resource Area encompasses a complex mix of public, tribal, state, and private



## Introduction

lands. BLM's responsibility for the oil and gas program on these lands varies, depending on the surface landowner or the surface managing agency.

Federal oil and gas leases are issued by BLM, with the consent of the surface managing agency having jurisdiction over the lands and subject to the conditions prescribed by the surface owner or managing agency. BLM's role for lands in the Wind River Indian Reservation is that of a technical advisor. The Lander RMP only deals with those public lands and mineral estates under the jurisdiction of BLM. These lands, generally, are available for oil and gas leasing, with appropriate protective measures. Mineral leasing and/or surface occupancy is sometimes not allowed in extremely sensitive areas. These areas include some crucial wildlife habitats and lands with high-aesthetic value such as the East Fork elk winter range, the Whiskey Mountain bighorn sheep habitat area, the Lander Slope, Red Canyon, and, currently the six wilderness study areas, pending congressional action to determine whether or not they will be designated as wilderness areas. Oil and gas leasing, exploration, and development all need to be addressed in the RMP, which will be used to answer these questions.

1. What public lands should be available for oil and gas leasing to provide for development and production of this federal resource?
2. What lease stipulations will be needed to minimize environmental impacts from oil and gas leasing and development?
3. Under what conditions should public lands be available for oil and gas geophysical exploration?

Planning criteria that will be used in addressing these issues and questions include giving consideration to the oil and gas potential in the resource area and identifying protective measures for areas with significant resource values. All existing oil and gas leases and geophysical exploration within wilderness study areas will be managed under BLM's Interim Management Policy until Congress acts on any wilderness recommendation. Leases issued before the passage of the Federal Land Policy and Management Act represent valid existing rights, but they are constrained by the specific terms and conditions that are attached to each lease. Use and development of these pre-FLPMA leases are subject to stipulations to prevent unnecessary and undue degradation of the land. In accordance with the Secretary of Interior's policy, unleased public

lands included in WSAs will not be leased until such time as it might be remanded for multiple-use management.

Sometimes decisions will be made in favor of developing high-value oil and gas resources, and sometimes decisions will be made that favor high-resource values such as crucial wildlife habitats or wilderness values.

## Landownership Adjustment

Public lands may be needed by local governments in the future to meet the demands of the communities of Lander, Riverton, Dubois, Shoshoni, Jeffrey City, and Hudson. In addition, other landownership adjustments may be needed in portions of the Lander Resource Area to efficiently manage and utilize the public resources. These adjustments may be done through exchanges, sales or recreation and public purpose (R&PP) patents.

Criteria to be used in identifying lands suitable for ownership adjustment, and which can be considered for disposal, are:

- Such tract because of its location or other characteristics is difficult and uneconomic to manage and is not needed by another federal agency.
- Such tract was acquired for a specific purpose and is no longer needed.
- Disposal of such tract will serve important public objectives, including but not limited to expansion of communities and economic development. Those lands identified for public sale will either be disposed of by noncompetitive (direct sale), modified competitive sale, or competitive bidding. Recorded mining claims or areas where there is an interest in minerals may prevent a sale of that parcel of land. Any parcel with important public values generally will not be offered for sale, lease or exchange. Land will be sold at fair-market value.

The Recreation and Public Purposes Act authorizes land to be conveyed only for a definite proposed project where there is a reasonable time table and a satisfactory development and management plan. Lands with national significance will not be conveyed.

Lands can only be exchanged if it has been determined that the public interest will be served by the exchange. Exchange of federal and

## Introduction

nonfederal lands will be considered if it will eliminate inholdings, create better management areas, and cause greater returns for all parties involved. Lands acquired through exchange should facilitate access to public land and resources, maintain or enhance important public values and uses, maintain or enhance local social and economic values, or facilitate implementation of other resource programs of the Lander RMP.

### Forest Management

There are four forested areas in the Lander Resource Area that have the capability for commercial timber production: Green Mountain, South Pass, Lander Slope and Dubois.

The major issues in all these areas are how to manage the timber resources while protecting or maintaining other resource values such as cultural/natural history, recreation, visual and wildlife.

BLM's goal in managing public forest land is to meet the nation's demand for wood products, manage the timber resources under the principles of multiple use and sustained yield, obtain fair market value for timber and other forest products, improve the utilization of these products, and facilitate the management and public use of forest land while protecting the land and its various resources.

### Wilderness Suitability

There are six wilderness study areas in the Lander Resource Area, which contain a total of 48,089 acres. They include Sweetwater Canyon, Copper Mountain and four areas in the Sweetwater Rocks. These six WSAs are being evaluated to determine if they are suitable or unsuitable for wilderness management. Wilderness recommendations are based on two criteria and six quality standards. These criteria address the area's wilderness values (i.e., size, naturalness, opportunities for solitude or primitive recreation, multiple-resource benefits, contribution to diversity of the National Wilderness Preservation System, and special features) as well as the manageability of the area as wilderness. The six standards are also used to determine an area's suitability for wilderness or nonwilderness. Those standards are:

1. Energy and mineral resource values (identified or potential)
2. Impacts to other resources or uses
3. Impact of nondesignation on wilderness values
4. Comments from the public in conjunction with BLM's analysis of the area
5. Local social and economic effects
6. Consistency of recommendation to resource-related plans of other agencies

These six WSAs are analyzed individually in the Wilderness Supplement. These six WSAs have been grouped into three management units: the four Sweetwater Rocks WSAs, the Copper Mountain WSA, and the Sweetwater Canyon WSA.

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## CHAPTER II

# ALTERNATIVES INCLUDING THE PREFERRED ALTERNATIVE

## INTRODUCTION (MANAGEMENT UNITS)

The Lander Resource Area has been divided into 13 management units, including the WSAs (see map 2-1). Management units were delineated based on resource values, competing land uses and areas that provide opportunities and needs for management actions. Alternatives were then formulated to resolve these issues and management needs for each unit. The 13 management units are: Green Mountain, Beaver Creek, Lander Slope, Red Canyon, South Pass, Gas Hills, East Fork, Dubois Badlands, Whiskey Mountain, Dubois Area, Sweetwater Canyon, Sweetwater Rocks, and Copper Mountain. The alternatives for the Sweetwater Canyon, Sweetwater Rocks (containing four WSAs), and Copper Mountain are addressed in the Wilderness Supplement.

## ALTERNATIVES INCLUDING THE PREFERRED ALTERNATIVE

### Alternatives Considered but Eliminated from Detailed Study

Two alternatives for managing livestock grazing were considered but eliminated from detailed study. They were: (1) maximize vegetative production, and (2) no domestic livestock grazing (see the Grazing Supplement for discussion of these alternatives).

### Wilderness

Of the alternatives considered for all WSAs, only one, the combination of units 120 (Larkin Dome) and 122 (Split Rocks) was dropped. This combination was first considered because these two units encompassed the most unique and manageable features of the four WSAs. After

further consideration, however, the consensus was that there was no advantage to such a combination, since the options of All Wilderness and Continuation of Present Management were adequately covered in the individual WSAs.

## Management Actions Common to All Alternatives

The management actions presented in this section are common to all of the alternatives, including the preferred alternative. They have been presented here to avoid repetition.

### Minerals

#### Existing Oil and Gas Leases

Any decisions reached in this RMP that would affect oil and gas leasing or add restrictions to oil and gas exploration and development activities are subject to valid existing rights. Once an oil and gas lease has been issued, it constitutes a valid existing right and BLM cannot unilaterally change the terms and conditions of that lease. Therefore, in each alternative where consideration is given to changing restrictions on oil and gas activities or closing an area to oil and gas leasing, existing leases would not be affected and the decisions could not be fully implemented until every lease has expired and the new restrictions have been added.

Another consideration for reaching decisions regarding oil and gas leasing and development was drainage. Drainage is the migration of oil or gas in a hydrocarbon reservoir because of a pressure reduction caused by production from other wells drilled in the reservoir. An oil and gas reservoir is a porous, permeable sedimentary rock formation containing quantities of oil and/or gas enclosed or surrounded by layers of less permeable or impervious rock.

After a determination by the BLM District Manager that lands owned by the United States are being drained of oil and gas by wells drilled on adjacent lands, the District Manager may execute agreements with owners of adjacent



Map 2-1  
Resource Management Units  
Lander Resource Area



## Alternatives Including the Preferred Alternative

lands, whereby the United States and its lessees shall be compensated for such drainage.

Where lands in any federal leases are being drained by adjoining wells on nonfederal lands, the federal lessee will be required to drill and produce all wells necessary to protect the federal leases from drainage. If for some reason drilling of protection wells is not feasible, the federal lessee must pay compensatory royalty to the United States in a predetermined amount. A royalty on oil and gas is a share of the oil and gas produced from a federal lease by the lessee. The United States usually receives 12 1/2 percent or one-eighth of the oil and gas produced from a lease.

Whenever the lessee or operator of a federal oil and gas lease decides to drill on the leasehold, all proposed drilling operations and related surface disturbance activities must be approved through an environmental review. Unless BLM advises an operator to the contrary, he will be required to furnish, at his expense, a cultural resource inventory that has been performed by a qualified resource specialist for the lands to be disturbed.

Drilling operations may not be conducted without an Application for Permit to Drill (APD). The APD must be filed at least 30 days before the date of anticipated operations if the operator wishes to assure that critical drilling commencement dates will be met. If operations have not begun within 90 days after approval of the APD, a new APD must be filed or an extension obtained.

If a field inspection was not made before surveying and staking, an onsite inspection by BLM and the operator will normally be required following the filing of the APD. When the inspection is on private surface, the surface owner will be included. The purpose of this field inspection is to thoroughly examine the proposed operation and develop methods to minimize adverse environmental impacts. The BLM will conduct an environmental analysis as appropriate (environmental assessment, EIS, or categorical exclusion), before an oil and gas field is developed. The standard stipulations for oil and gas leases are listed in Appendix 2.

### Locatable Minerals

Whenever a mineral is found on public lands in quantity and quality sufficient to make the lands valuable for development, it comes under the scope of the mining laws. Whether or not a particular mineral deposit is locatable depends on

several factors such as quality, quantity, mineability, demand, and marketability. Minerals that are not locatable are those specifically listed in the Mineral Leasing Act of 1920, as amended, and the common variety minerals such as sand, stone, gravel, pumice, pumicite, cinders, clay, and petrified wood. Ordinary deposits of limestone and fill material (common borrow) are not locatable minerals (the Materials Act of 1947 and amended by the act of 1955).

All public lands not formally withdrawn or segregated from mineral entry are open for exploration and development of locatable minerals. Any withdrawals over 5,000 acres in size would require congressional approval. Locatable minerals in the resource area include iron, gold, silver, tungsten, copper, uranium, zeolites, feldspar, thorium, and rare earths.

Exploration and development of locatable minerals on public lands are managed by BLM through the 43 CFR 3809 regulations. These regulations require that the exploration and development of locatable minerals shall occur in such a manner as to prevent unnecessary and undue degradation of the land.

**Validity Examination for Locatable Minerals.** A validity examination is a field examination of an unpatented mining claim by a BLM or U. S. Forest Service minerals examiner to verify or refute the discovery of a valuable minerals deposit alleged by a mineral claimant. Validity examinations may be requested under the following conditions.

- Where a mineral patent application has been filed and a field examination is required to verify the validity of the claim(s).
- Where there is a conflict between a land disposal application and a mining claim, and land disposal is deemed in the public interest or where the statute authorizing the disposal requires clearance of any encumbrance.
- Where the land is needed for a federal program.
- Where a mining claim is located under the guise of the mining law and flagrant unauthorized use of the land or mineral resource is occurring.

### Saleable or Common Variety Mineral Materials

The Materials Act of July 31, 1947, as amended by the acts of July 23, 1955, and September 28, 1962, identified common variety minerals that include, but are not limited to, sand, stone, gravel,

## Alternatives Including the Preferred Alternative

pumice, pumicite, cinders, and clay. The minerals are sold by BLM under contract or provided through a free-use permit.

Applications for the removal of common variety mineral materials, including sand and gravel, will continue to be approved or disapproved on a case-by-case basis. Stipulations to protect important surface values will be employed, based on interdisciplinary review of each proposal.

### Coal Leasing

Coal leasing and development is not an issue for the RMP. The coal in this area of Wyoming has either unknown or low-development potential in the foreseeable future and no leasing and development interest was identified by anyone during the call for coal resource information, the issue identification process, or during the alternative formulation process. Therefore, the coal screening process, including the application of unsuitability criteria, has not been conducted at this time. This does not imply, however, that coal exploration, leasing and development is incompatible with this plan. Coal exploration would be allowed under the guidance established for surface disturbing activities presented in Appendix 2. If an application for a coal lease is received sometime in the future, an appropriate land-use and environmental analysis, including the coal screening process, will be conducted to determine whether or not the coal areas applied for are acceptable for development and for leasing consideration. The RMP will be amended as necessary.

The Lander Resource Area is not within a designated coal production region. Federal coal leasing in areas outside of designated regions may be considered apart from the competitive leasing process set out in 43 CFR 3420.3 through 3420.5-2. This is essentially done on a case-by-case basis, called "Leasing on Application", under the appropriate provisions of 43 CFR 3425 (note that the sale and issuance of Federal coal leases under these provisions is still done through a competitive bidding process). Based on the lack of interest in and the low-development potential of the coal resource in this area, it is unlikely that any federal lease application would be filed in the foreseeable future.

## Lands Program

### Sales

Specific parcels of public land are considered for disposal in this RMP under the authority of the Federal Land Policy and Management Act of 1976. In addition to these specific parcels, there are other lands which may be disposed of to serve important public objectives, including but not limited to expansion of communities and economic development. An example of public lands which could be disposed of are sanitary landfill sites to local governments. Disposals to serve other public objectives may be considered and allowed on a case-by-case basis. These lands could be sold by direct sale, modified competitive sale, or competitive sale, depending on the method which would best meet the public need. Any lands which are specifically identified for sale through this RMP would be offered for sale through one of the following three methods.

**Noncompetitive - Direct Sale.** If the sale parcel is isolated by a single landowner, the tract will generally be offered to that landowner without any type of competition at the appraised fair-market value. This type of sale will normally be used when a parcel is without public access, and it is not located near an urban area or near an area with rapidly increasing land values. This approach will minimize impacts to present users and adjoining landowners, and it will reduce the impact on county governments of mediating public access.

**Modified Competitive Sale.** If the parcel is isolated and surrounded by two or more adjoining landowners, the parcel will generally be offered under a modified competitive sealed bid process to all the adjoining landowners at the appraised fair-market value. Under this approach, the high bidder will be the successful bidder. If the adjoining owners do not bid on the property, the land will be reoffered for sale, and no preference right will be provided on the reoffered sale.

**Competitive Bidding.** If there are no overriding reasons for modifying competition or direct sale, the land must be offered through competitive



## Alternatives Including the Preferred Alternative

bidding. Public access or the lack of public access is an important factor in determining proper bidding procedures. The presence of public access will normally override the other two types of sales, and parcels with public access over a city, county, state, federal highway, or other type of public access route will normally be sold by competitive procedures.

### Recreation and Public Purpose Disposals

The Recreation and Public Purposes (R&PP) Act of June 14, 1926, as amended, authorizes land to be conveyed out of federal ownership only for a definitely proposed project and where there is a reasonable time table for development and a satisfactory management plan. Lands having national significance will not be conveyed. Proposals involving over 640 acres require comprehensive land-use plans and zoning regulations and at least one public meeting. The R&PP Act shall not be used to provide sites for the disposal of permanent or long-term hazardous wastes.

### Exchanges

BLM recognizes that numerous opportunities exist for public interest land exchanges with the nonfederal sector. Exchanges other than the parcels specifically identified in this RMP may be considered and allowed on a case-by-case basis. BLM has a responsibility to work closely with other federal resource management agencies, state and local governments, and the private sector to complete these mutually beneficial transactions. Benefits to be derived for the federal and nonfederal sectors include elimination of inholdings, better management areas, and greater economic returns for all concerned.

## Recreation Program

### Recreation Management

The primary goal for recreation management in this RMP is to ensure the continued availability of outdoor recreational opportunities the public seeks that are not readily available from other governmental or private entities. Other goals include protecting resources, meeting legal requirements for visitor health and safety, and mitigating resource-user conflicts involving recreation.

A broad range of outdoor recreational opportunities will continue to be provided for all segments of the public, commensurate with demand and resource availability. Trails and other means of public access will continue to be maintained and developed where necessary to enhance recreational opportunities. Developed recreational facilities receiving the heaviest use will receive first priority for operation and maintenance funds. Sites that cannot be maintained to acceptable health and safety standards will be closed until deficiencies are corrected. Investment of public funds for new recreational developments will be permitted only on land identified for retention in public ownership.

Recreational resources will continue to be evaluated on a case-by-case basis. Such evaluation will consider the significance of the proposed project and the sensitivity of recreational resources in the affected area. Stipulations will be attached as appropriate to assure compatibility of projects with recreational management objectives.

Special recreational use permits will continue to be required for all commercial, competitive and organized events.

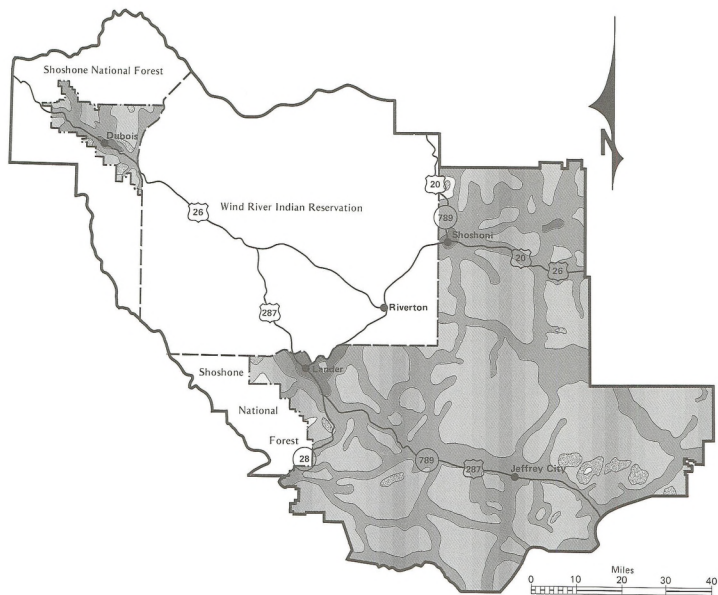
### Recreation Opportunity Spectrum

Public lands are managed to provide a broad spectrum of recreation opportunities in the Lander Resource Area from primitive to rural in nature. The management objective is to provide a range of opportunities for recreation experiences now and in the future (see map 2-2).

### Continental Divide National Scenic Trail

The Continental Divide National Scenic Trail was established by Congress in 1978. The United States Forest Service (USFS) developed a comprehensive management plan for the trail in 1981. BLM is responsible for implementing the broad direction set forth in that plan.

The trail route on public land in Wyoming has not been specifically selected, but will generally fall on the east rim of the Great Divide Basin. The rim includes Green Mountain, Crooks Mountain and Cyclone Rim in the Lander Resource Area. This segment of the Continental Divide Trail, known as the Red Desert, receives very limited use and has few conflicts. Existing primitive roads next to the Continental Divide are considered the



- Primitive
- Semi-Primitive Non-motorized
- Semi-Primitive Motorized
- Roaded Natural
- Rural
- Urban

Map 2-2  
Recreation Opportunity Spectrum (ROS)  
Lander Resource Area

## Alternatives Including the Preferred Alternative

most feasible and economic means of creating a continuous trail.

The BLM does not plan to establish a fixed route for the trail through the Rawlins District. There are very few people hiking the route, far too few to justify the expense of establishing over a 200-mile route that would involve construction, signing and maintenance. Hikers use a variety of routes to go from the Shoshone to Medicine Bow National forests—a situation that would continue, even with a fixed, developed route. Some people prefer to hitch-hike along the highways in this segment, and others prefer the cross-country trek through the Great Divide Basin (see map 2-3). The lack of a developed, marked trail requires one to find his or her own route, a challenge in itself—which may be one of the major attributes of this segment.

The actions BLM plans to follow are:

1. Mark the trail with signs where it crosses major travel routes. This could be done along both the east and west rims of the Great Divide Basin.
2. Develop a trail brochure to be distributed to interested persons. The brochure would include: 1) the area between the Shoshone and Medicine Bow National forests, including all of the Great Divide Basin; 2) the east and west rims of the Great Divide Basin; 3) landownership; 4) roads and other man-made features; 5) several hiking route alternatives; 6) recreational attractions such as national historic trails and rivers; historical sites such as South Pass City; scenic areas such as Oregon Buttes, etc.; 7) water sources with recommendations that persons boil all water; and 8) user information on hazards, trespassing on private lands, weather information, etc.
3. Seek cooperative agreements with area ranchers for the trail.
4. Write a management plan that will incorporate these actions. Periodically revise the plan, perhaps on a 5-year basis, to deal with management problems and issues that may occur.

### Oregon/Mormon Pioneer Trail Activity Management Plan

A statewide recreation and cultural resources activity management plan will provide the necessary guidance for resource allocations and

decisions affecting the Oregon/Mormon Pioneer National Historic Trail. A summary of the plans guidance follows.

This plan will outline methods of protection, use and management for the BLM-administered portions of both trails. The plan will also describe the opportunities and constraints for the management of BLM-administered trail lands that are adjacent to private lands.

The management plan for the Oregon and Mormon Pioneer trails encompasses trail-crossed lands in five BLM resource areas within three BLM districts. One of these resource areas is the Lander Resource Area (see map 2-4 for the location of the trails in the resource area). Both the Oregon and Mormon Pioneer trails follow the same route in the Lander Resource Area.

The management plan will focus on methods of management that will protect and maintain important trail values, while allowing public use and enjoyment of the trails. Important segments of the trails and trail-related sites may be recommended for special protection, interpretation, use, or other management measures. Some fragile trail segments may be recommended for limited use by commercial users or the public, while other segments may be recommended for many types of uses. A protective corridor, designed to protect the physical and visual characteristics of the trails, will also be recommended for some segments. Historical sites along the trail may be recommended for nomination to the National Register of Historic Places to provide additional protection or recognition.

The management plan will also consider the effects of BLM management of the trails on adjacent private landowners. If management actions could cause adverse effects to private landowners, BLM will coordinate with them to minimize the problems. The plan will clearly state that use of privately owned trail segments or sites be contingent on the permission of the affected landowner. Traditional land uses of BLM-administered trail portions that are compatible with protection of trail resources will continue to be allowed.

The Wyoming BLM Draft Oregon/Mormon Pioneer Trail Management Plan will be presented for public review and comment at approximately the same time as the Draft Lander RMP. The Oregon/Mormon Pioneer Trail Management Plan will incorporate the same management actions that appear in the Lander RMP.



 Continental Divide

Map 2-3  
Continental Divide  
Lander Resource Area



Oregon - Mormon Pioneer Trails

Map 2-4  
Oregon - Mormon Trail  
Lander Resource Area



## Alternatives Including the Preferred Alternative

### Cultural Resources

#### Standard Protective Measures for Cultural Resources

Within the various programs that are involved in the alternatives, there are standard measures that are designed to offer protection to BLM-administered cultural resources. This section describes the various standard measures for the protection of cultural resources.

Protective measures used in the oil and gas, common variety minerals, coal, livestock grazing, fish and wildlife, forestry, landownership adjustments and utility systems, recreation, cultural/natural history, and access programs are: measures for cultural resource protection in these programs include cultural resources inventories, ranging from record searches to field inventories of potential impact areas; evaluation of cultural sites and objects located by the inventories; and mitigation of anticipated adverse impacts on significant cultural resources. Mitigation may include avoidance, data recovery (including excavations), and/or protection/stabilization measures. Avoidance is the primary and preferred mitigative measure used for protecting cultural resources. Consultation with the Wyoming State Historic Preservation Office and the Advisory Council on Historic Preservation will also be required for all program actions that are expected to affect significant cultural resources.

Protective measures used in the uranium, gold and other locatable minerals programs are: the exploration for and extraction of locatable minerals such as uranium, gold, copper, etc., on BLM-administered lands is covered under regulations 43 CFR 3809. The BLM has limited authority to protect cultural resources affected by mining operations.

Surface management regulations under the United States mining laws state that mining operations are managed according to the size and type of the operation. Large mining operations (those disturbing over 5 acres) are managed essentially as are oil and gas operations (as described previously in this section). Protective measures for small mining operations, those disturbing 5 acres or less, include a 15-day notice period before commencing mining operations; a prohibition of the operator from knowingly disturbing any "historical or archeological site, structure building, or object on federal lands" (43 CFR 3809.2-2(e)(1)); and a 10-day period in which known cultural resources endangered by

operations may be evaluated, protected and/or removed. The BLM monitors casual-use operations where negligible disturbance is anticipated (i.e., where mining operations will not involve the use of mechanized earth-moving equipment or explosives, or where they will not involve the use of motorized vehicles in off-road vehicle closure areas), to ensure that unnecessary and undue degradation are not occurring to cultural resources.

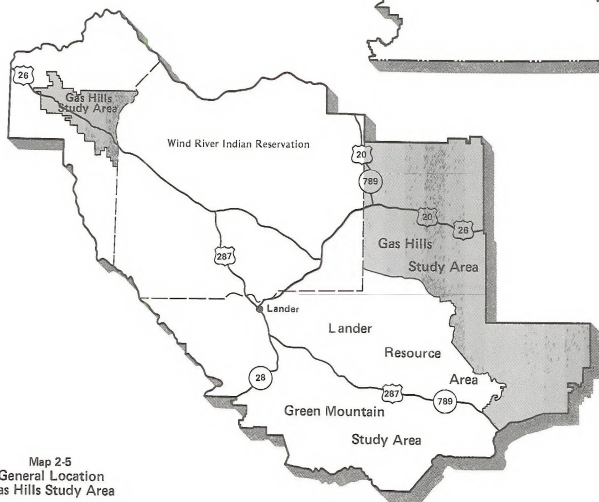
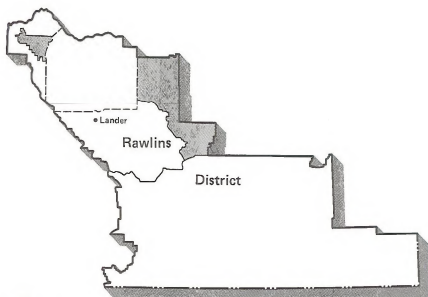
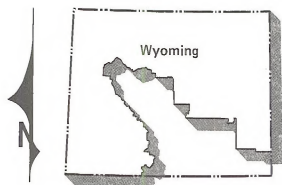
Cultural resource inventories are not required for small operations. Evaluations or mitigative measures are the same as those for uranium, gold and other locatable minerals. Operations are not further restricted unless they cause unnecessary or undue degradation of the federal lands (43 CFR 3809.2-2). This applies equally to cultural resources that are listed on, or eligible for, the National Register of Historic Places.

#### Other Protective Measures for Cultural Resources

Certain land-management measures that encompass some or all programs are used to protect cultural resources. These are land withdrawals and segregations that can prohibit some or all types of land use or appropriation. Some existing withdrawals are in place in the Lander Resource Area that served to protect significant cultural resources. There are also lands that were segregated from mining operations under the authority of the classifications and multiple-use act. These segregations and withdrawals were put into effect years ago and have recently been reviewed and approved for continuance.

### Livestock Grazing and Wild Horses

Wild Horse and livestock grazing decisions were reached in 1983 for the Green Mountain EIS area, which is about one-half of the Lander Resource Area, involving approximately 1.2 million acres of public lands (see map 2-5). These decisions were formulated through a land-use plan and an environmental impact statement for grazing management. The land-use plan and EIS covered the Green Mountain, Beaver Creek, South Pass, Red Canyon, and Lander Slope management units, as well as the Sweetwater Canyon wilderness study area. Allotment categorization was conducted on all the allotments in the Green Mountain EIS area. This categorization process was also conducted on the allotments in the Gas Hills study area for the preferred alternative. Table



Map 2-5  
General Location  
Gas Hills Study Area

## Alternatives Including the Preferred Alternative

2-1 is a summary of the allotments in the Lander Resource Area by management category. These categories guide management practices in each allotment to maintain (M), improve (I) or protect (C) the basic soil and vegetation resources.

Decisions for the Green Mountain Grazing EIS area are in the Green Mountain Rangeland Program Summary (see Appendix A) in the Livestock Grazing Supplement. They have been incorporated in all alternatives in the RMP.

A detailed discussion of the grazing alternatives for the Gas Hills Grazing EIS area can be found in the Grazing Supplement (see map 2-5).

### Wilderness

#### Wilderness Study Areas

The Sweetwater Rocks, Sweetwater Canyon, and Copper Mountain wilderness study areas will continue to be managed in compliance with the Interim Management Policy until they are studied, reviewed and acted on by Congress (see the Wilderness Supplement).

The Wilderness Supplement contains a

complete analysis of the wilderness study areas in the Lander Resource Area. It also presents the proposed action and the alternatives considered for wilderness. The proposed action is management common to all alternatives in this RMP.

The cumulative impacts of combining the wilderness alternatives with the remainder of the RMP alternatives is presented in tabular form in Chapter IV, Environmental Consequences.

#### Former Wilderness Study Areas

The Whiskey Mountain and Dubois Badlands management units were wilderness study areas until 1982, when both were eliminated from wilderness study because each one was less than 5,000 acres in size. The decision by the Secretary of Interior to exclude these two units was appealed to the courts by the Sierra Club. During the writing of this RMP, this decision was reversed. Supplements (including public review opportunities) for Whiskey Mountain and Dubois Badlands WSAs will be prepared in 1986, and recommendations will be included in the final RMP/EIS.

**TABLE 2-1**  
**ALLOTMENT CATEGORIZATION SUMMARY**  
**FOR THE LANDER RESOURCE AREA**

Allotment Category	Number of Allotments	Percent of Total	Total Acreage	Percent of Total	Grazing Preference (AUMs)	Percent of Total
<b>GAS HILLS STUDY AREA</b>						
M	51	39	650,000	54	59,972	50
I	38	29	430,000	40	51,220	43
C	41	32	110,000	6	7,936	7
<b>Subtotals</b>	<b>130</b>	<b>100</b>	<b>1,190,000</b>	<b>100</b>	<b>119,128</b>	<b>100</b>
<b>GREEN MOUNTAIN EIS AREA</b>						
M	33	21	84,000	6	8,211	5
I	86	54	1,333,000	93	155,869	94
C	40	25	14,900	1	2,013	1
<b>Subtotals</b>	<b>159</b>	<b>100</b>	<b>1,431,900</b>	<b>100</b>	<b>166,093</b>	<b>100</b>
<b>LANDER RESOURCE AREA TOTALS</b>						
M	84	29	734,000	28	68,183	24
I	124	43	1,763,000	67	207,089	73
C	81	28	124,900	5	9,949	3
<b>Totals</b>	<b>289</b>	<b>100</b>	<b>2,621,900</b>	<b>100</b>	<b>285,221</b>	<b>100</b>



## Alternatives Including the Preferred Alternative

### Management of Areas Designated as Wilderness

If any of the WSAs addressed in this RMP are added by Congress to the National Wilderness Preservation System, they will be managed in compliance with the Wilderness Management Policy. Site-specific wilderness management plans will be developed for such areas (see the Wilderness Supplement for more details).

### Management of Areas Reviewed by Congress but not Designated as Wilderness

Areas not designated by Congress as wilderness will be managed in accordance with other applicable guidance provided by this resource management plan.

### Wildlife and Fisheries Program

#### General

Fish and wildlife habitat will continue to be evaluated on a case-by-case basis as a part of project level planning. Such evaluation will consider the significance of the proposed project and the sensitivity of fish and wildlife habitat in the affected area. Stipulations will be attached as appropriate to assure compatibility of projects with management objectives for fish and wildlife habitat. Habitat improvement projects will be implemented where necessary to stabilize and/or improve unsatisfactory or declining wildlife habitat condition. Such projects will be identified through habitat management plans or coordinated resource management activity plans.

Forage and cover requirements for wildlife will be incorporated into allotment management plans and will be specific to areas of primary wildlife use. Range improvements generally will be designed to achieve both wildlife and range objectives. Vegetative manipulation projects will be designed to minimize impact on wildlife habitat and to improve it whenever possible. The Wyoming Game and Fish Department (WGFD) will be consulted in advance on all vegetative manipulation projects. Animal control programs will be coordinated with the U.S. Fish and Wildlife Service and WGFD.

Management actions within floodplains and wetlands will include measures to preserve, protect, and if necessary, restore their natural functions (as required by Executive Orders 11988 and 11990). Management techniques will be used to minimize the degradation of streambanks and the loss of riparian vegetation. Bridges and culverts will be designed and installed to maintain adequate fish passage.

Riparian habitat needs will be taken into consideration in developing livestock grazing systems and pasture designs.

Wildlife reintroductions and fish stocking proposals will be evaluated and recommendations will be made to the WGFD. BLM policy requires that a Habitat Management Plan (HMP) be prepared prior to any wildlife reintroduction.

### Threatened and Endangered Species

No activities will be permitted in habitat for threatened and endangered species that would jeopardize the continued existence of such species. Whenever possible, management actions in habitats for threatened or endangered species will be designed to benefit those species through habitat improvement. The U.S. Fish and Wildlife Service will be consulted before implementing projects that may affect threatened and endangered species habitat. If a "may affect" situation is determined to exist by BLM biologists, then consultation with the U.S. Fish and Wildlife Service will be initiated according to Section 7 of the Endangered Species Act of 1973, as amended.

### Areas of Critical Environmental Concern

Significant scenic, cultural and wildlife values exist in portions of Beaver Creek, Gas Hills, Lander Slope, Red Canyon, Dubois Badlands and South Pass Management units, which warrant the focus of management's attention. Those areas would be designated as areas of critical environmental concern by virtue of approval of this plan (see Chapter V for more details on the areas affected by ACEC designation).

## **Alternatives Including the Preferred Alternative**

### **Surface-Disturbing Activities**

All surface-disturbing activities would be subject to the stipulations in Appendix II, as applicable.

### **The Alternatives Considered in Detail**

This section provides a description of the four alternatives (alternatives A, B, C and the preferred alternative) considered for the Lander Resource Area. Each alternative is described in terms of the planned management actions for specific geographic areas (management units) within the resource area. Each of these alternatives incorporates the management actions described in the previous section (see table 2-2).

# Alternatives Including the Preferred Alternative

## ALTERNATIVES PRESENTED IN DETAIL

TABLE 2-2

Alternative A	Alternative B	Alternative C	Preferred Alternative
<p><b>1. Energy and Minerals</b></p> <p><b>A. Oil and Gas</b></p> <p>The Green Mountain, Beaver Creek, South Pass, Gas Hills, and Dabola Area Management Units would be treated similarly under this alternative. They would be open for leasing, exploration and development, except for land withdrawn from mineral entry around the Split Rock National Landmark, the Aspen Grove Composite and on Rocky Ridge in the Beaver Creek unit, land designated from mineral entry as the Charlie Gardens rock art and picnic area, the land withdrawn as Devil's Gate National Landmark and the Interpretive site at Devil's Gate National Monument Unit. No-surface occupancy restrictions to protect water quality, fisheries, riparian areas, sage grouse breeding areas (land), threatened and endangered species, and soils on steep slopes would be applied where needed. Seasonal restrictions for exploration activities would be used where needed to protect big game critical winter range, elk calving areas, elk calving areas, sage grouse nesting areas, and riparian nesting areas.</p> <p>In addition to the restrictions mentioned above, no-surface occupancy restrictions would be applied to the experimental plot picnic area on Green Mountain and the elk critical winter range on the north slope of Green Mountain within the Green Mountain Management Unit; Jeffrey City and the Jeffrey City airport, Beaver Rim, nesting at Highway 207 and surrounding miles north, 1/4 mile on either side of the Ogeen/Hamm Trail or the visible horizon, whichever is closer, the Interpretive site at Split Rock within the Beaver Creek Management Unit, and Aspen Spring Canyon and Snowy Bluff within the Dabola Area Management Unit.</p> <p>All of the tributary mountains and back rock and rim of the Lander Slope, Red Canyon, and Dabola National Management Units would remain closed to oil and gas leasing. However, exploration and development would be permitted on existing leases (there are existing leases in the back rock and Dabola lands units) because they are well existing rights.</p>	<p>The Management actions for the Green Mountain and Dabola Area Management Units would be the same under this alternative (Alternative A) as under Alternative A. The units would be open for leasing, exploration and development with no-surface occupancy restrictions to protect water quality, fisheries, riparian areas, sage grouse breeding areas, wild, threatened and endangered species, riparian areas, wildlife, and facilities to animals escape. Leasing, exploration and development, except for land withdrawn from mineral entry around the Split Rock National Landmark, on Rocky Ridge, and at the Aspen Grove Composite in the Beaver Creek unit, land designated from mineral entry as the Charlie Gardens rock art and picnic area, and the land withdrawn as Devil's Gate National Monument Unit. No-surface occupancy restrictions would be applied to the top Spring slope proposed near the Interpretive site and the Split Rock proposed riparian lands in the Beaver Creek Management Unit, riparian, riparian habitat, the proposed riparian habitat, the proposed riparian habitat, the proposed riparian habitat, and the Atlantic City and Big Belter Gulch components to the South Pass Management Unit and the North's Gate National Monument Unit. Seasonal restrictions for exploration activities would be used where needed to protect wildlife habitat. (See Alternative A).</p> <p>The Lander Slope, Red Canyon, Jeffrey Mountain, Red Rock, and Dabola National Management Units would be open for leasing, exploration and development. No-surface occupancy restrictions would be used where needed to</p>	<p>Management actions under this alternative would be the same for all management units but would vary for different areas within each unit, depending on the potential for occurrence of oil and gas. Each unit would be divided into four areas:</p> <ol style="list-style-type: none"> <li>1. Green geologic structure (H2A),</li> <li>2. Areas with low potential for occurrence of oil and gas,</li> <li>3. Areas with moderate potential for occurrence of oil and gas,</li> <li>4. Areas with low potential for occurrence of oil and gas.</li> </ol> <p>This classification process would be dynamic, allowing areas classified as having low potential to be added into a moderate or high category and areas with moderate potential to be changed into low or high potential areas, depending solely on new geologic information. Management guidelines for each type of oil and gas area would be:</p> <ol style="list-style-type: none"> <li>a) Green geologic structure and areas with high potential for occurrence of oil and gas. No seasonal restrictions would be used where they were needed to protect threatened and endangered species.</li> <li>b) Areas with moderate potential for occurrence of oil and gas. No-surface occupancy restrictions would be used only where they were needed to protect nationally significant cultural and natural history resources or threatened and endangered plant and animal species. Development plans would be designed to avoid impacts to these resources. Disturbance, intensity would be given to maintaining the economic recovery of the oil and gas resource.</li> <li>c) Development plans would be limited for operations within sensitive areas to that adverse impacts to surface values would be minimized. Development plans would also have the potential to reduce aggregate road and pipeline construction costs.</li> <li>d) Areas with moderate potential for occurrence of oil and gas.</li> </ol>	<p>Modified Alternative C was chosen as the preferred alternative for the Green Mountain, Beaver Creek, Lander Slope, Red Canyon, South Pass, Gas Hills, and Dabola Area Management Units. The units would be kept open for leasing, exploration, and development under the following guidelines:</p> <p>New leases issued in areas with high potential for occurrence of oil and gas would be conditioned with no-surface occupancy and seasonal restrictions on a case-by-case basis and only when necessary to avoid a significant impact on another resource. All restrictions, except those needed to protect threatened and endangered plant and animal species or nationally significant cultural and natural history resources, would be subject to waiver if the authorized officer determined that they were no longer needed or if the lease or operation demonstrated, with an acceptable development plan, that adverse impacts to other resources could be adequately mitigated.</p> <p>New leases issued in areas with low, moderate, or no potential for the occurrence of oil and gas would be conditioned with no-surface occupancy restrictions, when needed, to protect water quality, fisheries, riparian areas, sage grouse breeding areas, wild, threatened and endangered species, and riparian areas. Development plans would be designed to avoid impacts to these resources. Disturbance, intensity would be given to maintaining the economic recovery of the oil and gas resource.</p> <p>Development plans would be limited for operations within sensitive areas to that adverse impacts to surface values would be minimized. Development plans would also have the potential to reduce aggregate road and pipeline construction costs.</p> <p>Seasonal surface and subsurface archaeological investigations would be undertaken in areas with high potential for both oil and gas development and the occurrence of cultural resources. This would allow significant cultural resources in high-development areas to benefit from study and excavation.</p> <p>b) Areas with moderate potential for occurrence of oil and gas.</p>

## Alternatives Including the Preferred Alternative

TABLE 2-2

### Alternative A

protect water quality, fisheries, riparian areas, sage grouse nests, soils on steep slopes, threatened and endangered species, and significant cultural resource areas where data recovery methods would not mitigate adverse impacts. They would also be applied to the Red Canyon National Natural Landmark. Seasonal restrictions for exploration activities would be used where needed to protect big game (mule deer, elk, and bighorn sheep), elk calving areas, sage grouse nesting areas, and raptor nesting areas.

### Alternative B

All restrictions (seasonal, no-surface occupancy, etc.) would be considered on a case-by-case basis. Restrictions imposed on exploration and production activities would be used only to avoid significant adverse impacts on another resource.

c) Areas with low potential for occurrence of oil and gas

No-surface occupancy restrictions would be used where needed to protect water quality, fisheries, riparian areas, sage grouse nests, soils on steep slopes, and significant cultural resource areas where data recovery methods would not mitigate adverse impacts. They would also be applied to the Red Canyon National Natural Landmark (NNL) in the Red Canyon Management Unit.

Seasonal restrictions for exploration activities would be used where needed to protect big game (mule deer, elk, and bighorn sheep), elk calving areas, sage grouse nesting areas, and raptor nesting areas.

### Alternative C

### Preferred Alternative

Management Units and West Spring Canyon and Shoshone River in the Shoshone Basin Management Unit.

Seasonal restrictions on exploration activities would be used when needed to protect big game (mule deer, elk, and bighorn sheep), elk calving areas, sage grouse nesting areas, and raptor nesting areas.

Implementation of the preferred alternative for these management units would allow for maximum management flexibility over the full range of resources. In areas of moderate, low, and no potential for occurrence of oil and gas, this alternative would provide for the protection of sensitive riparian resources, critical wildlife habitat, fragile areas, and historical resources, while providing opportunities for exploration and development of the oil and gas reserves. In areas of high potential for the occurrence of oil and gas or in areas of established production such as the Kibbi, this alternative would allow exploration and development activities by minimizing the restrictions imposed on these activities. It would also provide for protection of threatened and endangered plant and animal species and nationally significant cultural and natural history resources.

Modified Alternative A was selected as the preferred alternative for the Shoshone Basin Management Unit. The unit would be open for leasing, exploration, and development. New leases would contain no-surface occupancy restrictions where needed to protect water quality, fisheries, riparian areas, sage grouse nests, soils on steep slopes, threatened and endangered species, cultural resource areas where data recovery methods would not mitigate adverse impacts, and the area previously included in the Shoshone National Monument. Seasonal restrictions would be used when needed to protect big game (mule deer, elk, and bighorn sheep), elk calving areas, sage grouse nesting areas, and raptor nesting areas.

The preferred alternative for the Shoshone Basin Management Unit would provide for the protection of the natural and visual character of the Shoshone Basin as well as critical wildlife habitat and fragile areas, while providing opportunities for exploration and development of oil and gas reserves within the unit.

Modified Alternative B was chosen as the preferred alternative for the Shoshone Basin Management Unit. All oil and gas leases would include no-surface occupancy restrictions.

Modified Alternative C was selected as the preferred alternative for the Shoshone Basin Management Unit. All oil and gas leases would include no-surface occupancy restrictions.

## Alternatives Including the Preferred Alternative

TABLE 2-2

## Alternative A

#### B. Locatable Minerals

[illegible]

## Alternative B

Under this alternative, management of the Buhio Area Management Unit would be the same as under Alternative A. The unit would be open for exploration and development of recoverable minerals, except within the Mam Spring Canyon segregated area.

The Green Mountain, Beaver Creek and Gus Hills management units would be managed similarly to the other units. They would be restricted for exploration and development, except for the components, placic sites, and cultural sites mentioned above.

In addition, the area within 640 feet of the Olympic Peak scenic site and the Green Mountain, Beaver Creek, and Gus Hills Creative Sites, Beaver Run Flow Highway 287 near Eureka, the Los Slough proposed National Register site, the San Joaquin River proposed withdrawal, additions, and streams with high-priority values in the Beaver Creek Management Unit and the stream reaches of the Sierra's Oro Nacional.

Nugular Site in the Gus Hills Management Unit would be closed to exploration and development. The area of peak time would be required for exploration and development within 350 feet of the Spawbeck camp in the Green Mountain and within 174 miles of the volcanic tephra from the Green/Green Trail in the Beaver Creek and Gus Hills units.

The Tenderloin, Red Gorge, Smith Pass, and Whiskey Mountain management units would be closed to exploration and development of locatable minerals, as would the portions of the Mammoth Park Management Unit that have not already been withdrawn from mineral entry. A withdrawal from mineral entry would be required to close these areas to exploration and development.

In the *Quinta Mediente* Management Unit, exploration and development of locatable minerals would be allowed on any existing claim that represent valid, existing rights. The remainder of the management unit would be closed, thus requiring a withdrawal from mineral entry.

## Alternative C

The Green Mountain, Beaver Creek, Lander Slope, Red Geyser, and Gas Hills management units would be managed the same under this alternative as under Alternative A. The units would be entirely open for exploration and development of locatable minerals, except within areas already withdrawn from mineral entry (see Alternative A).

The South Pass, East Fork, Dubois Basins, Windley Mountain, and Dubois area management units would be open to explorative and development of locatable minerals. This would require reevaluation of the existing withdrawal in the East Fork Management Unit and aggregations in the South Pass, Windley Mountain and Dubois management units. A plan of operations would be required on all mining activities within the South Pass Management Unit.

No seasonal restrictions to protect watershed and wildlife values in the Deltaic Badlands Management Unit would be applied.

Deferred Alternative

Alternative A was chosen as the preferred alternative for the Lubbock Area Management Office. The unit would be open for the exploration and development of locatable minerals, except for the segregated area in Warm Springs Canyon. Implementation of this alternative would require withdrawal of the segregated area in Warm Springs Canyon from appropriation under the mining laws. It would also be consistent with the management objective of protection of the scenic and historical characteristics of the canyon.

[illegible]

## Alternatives Including the Preferred Alternative

TABLE 2-2

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
			<p>Implementation of the preferred alternative would allow for exploration and development of localizable mineral resources, but it would protect areas where exploration and development activities could cause adverse impacts to other significant values.</p> <p>A modified alternative was selected as the preferred alternative for each of the country management units. The units would be open for exploration and development of localizable minerals, except for areas already segregated or withdrawn from mineral entry. A plan of operations would be required for exploration and development within the following areas:</p> <p>The highly visible Lander Slope within the Lander Slope Management Unit (modified Alternative A);</p> <p>All operations within the South Pass Management Unit (modified Alternative A);</p> <p>The Red Canyon National Natural Landmark within the Red Canyon Management Unit (modified Alternative A);</p> <p>Lands around the campgrounds and picnic areas on Green Mountain and within 350 feet of the Spearhead cabin and on crucial elk winter range on the north slope of Green Mountain within the Green Mountain Management Unit (modified Alternative A);</p> <p>Within 660 feet of Glimpse Place Historic Site and the Killed Mountain</p> <p>Communicative Site, along Beaver Run starting at Highway 287 and extending north 8 miles, within the 700 acre proposed National Register site, within a buffer zone along streams with high-discharge values, or within 1/4 mile or the visible horizon of the Greenhorn Trail (modified Alternative B);</p> <p>Within the area previously included in the Dakota Redlands wilderness study area in the Dakota Redlands Management Unit (modified Alternative C).</p> <p>Implementation of the preferred alternative would allow opportunities for exploration and development of localizable mineral resources, but it would protect areas where exploration and development activities could cause adverse impacts to other significant resource values.</p>

## Alternatives Including the Preferred Alternative

TABLE 2-2

Alternative A	Alternative B	Alternative C	Preferred Alternative
<p><b>G. Phosphates</b></p> <p>The Lander Slope, Red Canyon and Beaver Creek management units are the only units that contain significant phosphate resources. No new prospecting permits or leases would be issued within the Lander Slope and Red Canyon Management Units.</p>	<p>The management actions under this alternative would be the same as under Alternative A. No new prospecting permits or leases would be issued within the Lander Slope and Red Canyon management units only.</p>	<p>Under Alternative C, the Lander Slope and Red Canyon management units would be available for prospecting, leasing and development of phosphates.</p>	<p>Modified Alternative C was chosen as the preferred alternative for the Lander Slope and Red Canyon management units. The units would be open for prospecting, exploration and development, and leasing with the standard protective requirements for surface-disturbing activities described in Appendix 2. The Beaver Creek Management Unit, the only other unit with phosphate deposits, would also be open for prospecting and leasing.</p>
<p><b>H. Other Actions</b></p> <p>Lands around Silver Canyon State Park would be withdrawn from mineral entry.</p>	<p>Under this alternative, lands around Silver Canyon State Park would be withdrawn from mineral entry, the same as under Alternative A.</p>	<p>Lands around Silver Canyon State Park would not be withdrawn from mineral entry.</p>	<p>The preferred alternative is Alternative A and would allow withdrawal from mineral entry of lands around Silver Canyon State Park in the Lander Slope Management Unit.</p>
<p><b>II. Fish and Wildlife</b></p> <p>Under Alternative A, the management of fish and wildlife resources would be the same in the Green Mountain, Lander Slope, Oak Hills, Dubois Meadows, and Dubois Area management units. Existing fish and wildlife habitat improvements would be maintained and routine habitat improvement projects would be completed (after interdisciplinary review) to enhance and maintain fish and wildlife resources.</p> <p>These management actions would also apply to the Beaver Creek, Red Canyon, and South Pine management units. In addition, the South Pine Management Unit and upper portions of the Beaverhead River and Beaver Creek drainages in the Beaver Creek Management Unit would be the focus of fisheries management in the resource area. Special actions such as alien management, beaver management, installing instream structures, and fencing portions of some streams and reservoirs would be undertaken in these areas. In the Red Canyon</p>	<p>Under this alternative, management of fish and wildlife resources would be the same as under Alternative A for all management units except the Hills. In the Oak Hills unit, the only difference is that riparian snags would be considered for reintroduction in the Beaverhead Reservoir.</p> <p>As under Alternative A, existing fish and wildlife habitat improvements would be maintained and routine habitat improvement projects would be completed in the Green Mountain, Lander Slope, Oak Hills, Dubois Meadows, Dubois Area, Beaver Creek, Red Canyon, and South Pine management units. Fisheries management would focus on the South Pine and Beaver Creek management units. Snags would be reserved for wintering elk in the Red</p>	<p>Under this alternative, management actions for fish and wildlife resources would be the same as for Alternative A, except for a prescribed burn provision to improve wildlife habitat in the Green Mountain, Lander Slope, Red Canyon, and South Pine management units.</p> <p>In the Lander Slope, Green Mountain, and Red Canyon units, prescribed burning techniques would be used in dense stands of dry sagebrush or mountain shrub habitat to increase forage for wintering elk, mule deer, moose, and bighorn sheep. Prescribed burning and other techniques to manipulate vegetation would also be used in the Red Canyon and South Pine units to promote regeneration of deciduous aspen and willow vegetation for moose and a wide variety of other wildlife species.</p>	<p>Alternative A is the preferred alternative for fish and wildlife management in the Beaver Creek, Bear Park, Dubois Meadows, Midway Mountain, and Dubois Area management units. Alternative A is the preferred alternative for fish and wildlife management in the Oak Hills unit, and Alternative C is the preferred alternative in the Green Mountain, Lander Slope, Red Canyon, and South Pine units. The provisions of these alternatives are described in the following discussion.</p> <p>Under the preferred alternative, existing fish and wildlife habitat improvements would be maintained in all management units and routine habitat improvement projects would be completed to enhance and maintain fish and wildlife resources.</p>





# Alternatives Including the Preferred Alternative

TABLE 2-2

Alternative A	Alternative B	Alternative C	Preferred Alternative
<p>Limited timber harvesting and management on the South Oregon, Old Hills, Whiskey Mountain, and Quabok Area management units would be allowed, with timber sales considered on a case-by-case basis. Timber sales in the Whiskey Mountain unit would be consistent with the cooperative agreement of 1969 among BLM, the U.S. Forest Service, and the state of Wyoming.</p> <p>Timber harvesting would be allowed on the Red Canyon Management Unit, as long as sales were consistent with the 1981 Memorandum of Understanding between BLM and the state of Wyoming.</p> <p>There would be limited timber harvesting of small, isolated stands in the South Blue Management Unit. Management would be based on permanent or historical values and maintenance of wildlife and riparian values. Approximate management might be restricted to improve forestland, timber harvesting would be allowed in the South Fork Management Unit. Harvesting would be considered as it was compatible with maintaining the integrity of critical site riparian values, as discussed under the 1972 Memorandum of Understanding among BLM, the state of Wyoming, and the U.S. Forest Service.</p>	<p>Restriction might include allowing only partial cuttings within 100 feet of perennial streams. Protection of soils on steep slopes, and maintenance of a proper mix of forest and cover for wildlife, slash piling and burning, following harvesting, may be required to encourage optimum site revegetation mainly by natural processes. Recreational and commercial thinning would be used as required.</p> <p>Limited timber harvesting and management on the South Oregon, Old Hills, Whiskey Mountain, and Quabok Area management units would be allowed with timber sales considered on a case-by-case basis. Timber sales in the Whiskey Mountain unit would be consistent with the cooperative agreement of 1969 among BLM, the U.S. Forest Service, and the state of Wyoming.</p> <p>Large timber sales would be allowed totaling up to 10,000 ac on the South Blue Management Unit, possibly in cooperation with the state of Wyoming, the U.S. Forest Service, and private landowners. Harvested would also be added to this area on a stand basis. That area would be intensively managed on the South Blue Management Unit to remove mature, overmature, and dead timber and to regenerate all areas to young healthy growing stands. The majority of the harvested areas of larger timber would be offered for sale until the areas have been harvested and regenerated.</p> <p>Harvest restrictions on the South Oregon and South Blue Management units would be the same as Alternative A. Individual clearcuts would be designed as irregular stream areas less than 25 acres in size. Harvesting restrictions could include allowing only partial cutting within 100 feet of perennial streams providing protection of soils on steep slopes, and maintenance of a proper mix of forest and cover for wildlife. Slash piling and burning, following harvesting, might be required to encourage optimum site revegetation mainly by natural processes. Recreational and commercial thinning would be used as required, some timber harvesting would be permitted where it was compatible with maintaining the integrity of critical site riparian values as discussed under the 1972 Memorandum of Understanding among BLM, the state of Wyoming, and the U.S. Forest Service.</p>	<p>Limited timber management on the South Oregon, Old Hills, Whiskey Mountain, and Quabok Area management units would be allowed, with timber sales considered on a case-by-case basis. Timber sales in the Whiskey Mountain unit would be consistent with the cooperative agreement of 1969 among BLM, the U.S. Forest Service, and the state of Wyoming.</p> <p>Small timber harvests of 1,000 ac or less would be allowed. In addition, 400 to 500 ac of aspen stands would be improved for big game habitat by cutting or prescribed burning. This unit would be open to harvest by clearcutting small areas. Harvesting would occur by natural processes in all stands. Harvested would also be added on a stand basis.</p> <p>Roadbed, point, pole, houselogs, and other products would be sold on a stand basis in the Red Canyon Management Unit until the majority of products had been harvested and the areas had been regenerated. Approximately 100 to 200 ac of aspen stands would be improved for big game habitat by cutting or prescribed burning. Harvesting would be limited in aspen stands by specifying partial cuts, removing products directly, and striving for complete regeneration of stands. In the upper riparian, harvest restrictions on the South Oregon and South Blue Management units would be similar. In such units, area harvesting would occur in aspen stands. In addition to the overstory, harvest of clearcuts would be determined on an individual project basis. If prescribed burning was employed in aspen stands, areas of clear would be determined in the same manner as clearcuts. Perennial streams would be protected and restrictions could include allowing only partial cutting to occur within 100 feet of the streambed.</p> <p>Normal regeneration of overstory on the Red Canyon Management Unit would be enhanced by modification of the soil during logging. Small volumes of overstory timber would be retained for sale in the South Blue Management Unit until the majority of the stands had been harvested and regenerated. Approximately 500 to 700 ac of aspen would be managed on riparian areas habitat. Management actions would include timber sales, prescribed burning, and prescribed burning. Management actions would be determined on an individual project basis. Recreational and commercial thinning would be enhanced by modification of the soil during logging in overstory stands. Approx-</p>	<p>sales in the Whiskey Mountain unit would be consistent with the cooperative agreement of 1969 among BLM, the U.S. Forest Service, and the state of Wyoming.</p> <p>The South Blue Management Unit would have a total of approximately 10,000 ac to be harvested over a period of 5 years. After this initial period, activity would cease for about 10 years and logging stands would be closed. Harvest restrictions on the South Blue Management Unit would include limiting individual clearcuts to irregular shaped areas less than 25 acres in size. Harvesting restrictions would be needed to protect perennial streams. Harvesting would also include allowing only partial cuttings within 100 feet of perennial streams providing for protection of soils on steep slopes, and maintenance of a proper mix of forest and cover for wildlife. Slash piling and burning, following harvesting, would encourage optimum site revegetation mainly by natural processes. Recreational and commercial thinning would be used as required. Roadbed and other minor forest products would also be sold on a stand basis during the periods in which the timber sales areas are active. Roadbed, point, pole, houselogs, and other products would be sold on a stand basis in the Red Canyon Management Unit until the majority of products had been harvested and the areas were regenerated. Approximately 100 to 200 ac of aspen stands would be improved for big game habitat by cutting or prescribed burning. Harvesting in aspen stands would be limited to partial cuts, with a goal of complete regeneration of stands. In addition, aspen stands and size of clearcuts required would be determined on an individual project basis.</p> <p>Small volumes of overstory timber would be retained for sale on the South Blue Management Unit until the majority of the stands have been harvested and regenerated. Approximately 500 to 700 ac of aspen would be managed on riparian areas habitat. Management actions would include timber sales, prescribed burning, or prescribed burning. Harvesting restrictions would include retaining only dead overstory and aspen trees in partial cuts. Areas of clearcuts used in aspen stands would be determined on an individual project basis. Recreational and commercial thinning would be enhanced by modification of the soil during logging in overstory</p>

# Alternatives Including the Preferred Alternative

TABLE 2-2

## Alternative A

### IV. Landownership Adjustments and Utility Systems

Under Alternative A, no lands in any of the management units would be sold or exchanged and recreation and public purpose permits would be issued on a case-by-case basis. Public lands in the Red Canyon and South Pass management units would be available for utility systems on a demand basis. Public lands in the Green Mountain, Beaver Creek, Oak Hills, and Snake Meadows management units would also be available for utility systems on a demand basis. However, systems in these units would be concentrated in existing utility corridors wherever possible. No major utility systems would be allowed in the East Fork or Lower Snake management units.

## Alternative B

The Green Mountain, Beaver Creek, Oak Hills, and Snake Meadows management units would be managed the same under this alternative as under Alternative A. No lands within the units would be sold or exchanged and recreation and public purpose permits would be issued on a case-by-case basis. Public lands in these units would be available for utility systems on a demand basis, but the systems would be concentrated in existing utility corridors wherever possible.

The East Fork and Lower Snake management units would also be managed the same under this alternative as under Alternative A. They would be managed the same as the units mentioned above, except that no utility systems would be allowed.

Public lands in the Shoshone Mountain management unit would be available for sale or exchange after the Bighorn Sheep Interagency Technical Committee has analyzed and recommended landownership adjustments. Recreation and public purpose permits would be issued on a case-by-case basis.

## Alternative C

Issues would require more natural, recreational or commercial thinning would be used as necessary.

Some timber management would be allowed in the East Fork management unit. Thinning would be recommended where it was compatible with maintaining the integrity of riparian habitat, as discussed under the 1972 memorandum of understanding among BLM, the state of Wyoming and the U.S. Forest Service.

Under this alternative, two isolated tracts of public land in the Green Mountain management unit, 4 isolated tracts in the Beaver Creek management unit, 4 isolated tracts in the Oak Hills management unit, three isolated tracts in the Snake Meadows management unit, and 11 tracts in the Shoshone Mountain management unit would be available for disposal through land exchanges or public sales. Recreation and public purpose permits would be issued on a case-by-case basis, and public lands would be available for utility systems on a demand basis, with the systems being concentrated in existing utility corridors wherever possible.

Twenty-seven isolated tracts of public land in the Lower Snake management unit would be considered for disposal through land exchanges or public sales. Recreation and public purpose permits would be issued on a case-by-case basis, and public lands within the unit would be open for utility systems on a demand basis.

Two isolated tracts of public land in the Shoshone Mountain management unit and four tracts in the East Fork management unit would be considered for disposal through land exchanges or public sales. Recreation and public purpose permits would be issued on a case-by-case basis, and the units would be closed to major utility systems.

The Red Canyon management unit would be managed the same under this alternative as under Alternative A. No lands within the unit would be sold or exchanged, recreation and public purpose permits would be issued on a case-by-case basis, and public lands within the unit would be available for utility systems on a demand basis.

No lands within the South Pass management unit would be sold or exchanged under this alternative. Recreation and public purpose permits would be issued on a case-by-case basis, but no major utility systems would be allowed in the unit.

## Preferred Alternative

Standards. Open areas should regenerate naturally. Recreational or commercial thinning would be used as necessary.

Some timber management could take place in the East Fork management unit where it was compatible with maintaining the integrity of riparian habitat, as discussed under the 1972 memorandum of understanding among BLM, the state of Wyoming and the U.S. Forest Service.

The Red Canyon and South Pass management units would be managed the same under the preferred alternative. No lands within the units would be sold or exchanged and recreation and public purpose permits would be issued on a case-by-case basis (Alternative A). These units would be available for utility systems (modified Alternative A). Rights-of-way may be granted only when no feasible or alternative course of designated rights-of-way corridor is available.

The Beaver Creek, Lower Snake, and Oak Hills management units would be managed similarly under the preferred alternative. Seventeen tracts in the Beaver Creek management unit, 13 tracts in the Lower Snake management unit, and 21 tracts in the Oak Hills management unit would be retained in public ownership. Twenty-six tracts in the Beaver Creek unit, 14 tracts in the Lower Snake unit, and 40 tracts in the Oak Hills unit would be considered for disposal through sale or exchange (modified Alternative C).

Recreation and public purpose permits would be issued on a case-by-case basis (Alternative A). The units would be open for major utility systems, with the exception of the Oregon/Wyoming Trail corridor, Sweetwater Canyon, and the Sweetwater Ridge in the Beaver Creek management unit, and the Oregon/Wyoming Trail corridor and the Sweetwater Ridge in the Oak Hills management unit, all of which would generally be avoided by major activities. The mountain slopes in the Lower Snake management unit would be avoided for major utility systems and the landscape near U.S. Highway 20 and 799 in the unit would be considered for major utility systems (modified Alternative A). Rights-of-way in the avoidance areas may only be granted when no feasible alternative route or designated right-of-way corridor is available. Utility systems in the Lower Snake, Beaver Creek and the Oak Hills units would be concentrated in existing corridors wherever possible.

## Alternatives Including the Preferred Alternative

TABLE 2-2

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
			<p>The preferred alternative for the Green Mountain Management Unit is Alternative C. Under this alternative, two isolated tracts of public land would be considered for disposal through land exchanges or public sales and recreation and public purpose permits would be issued on a case-by-case basis. Public lands in the Green Mountain unit would be available for utility systems on a demand basis, but the systems would be concentrated in existing utility corridors whenever possible.</p> <p>The preferred alternative for the Main River Management Unit is modified Alternative C. Most tracts would be retained in public ownership but could be considered for exchange to either the Wyoming Game and Fish Department or the U.S. Fish and Wildlife Service, if the tracts would be used for management of elk winter range. Recreation and public purpose permits would be issued on a case-by-case basis; the majority would be avoided for locating major utility systems.</p> <p>Under the preferred alternative for the Double Butte Management Unit, those tracts would be considered for disposal, preferably through exchange (modified Alternative C). Recreation and public purpose permits would be issued on a case-by-case basis (Alternative A). The unit would be avoided when locating major utility systems (modified Alternative B). Right-of-way may be granted only when no feasible alternative exists or designated right-of-way overlaps is available.</p> <p>The preferred alternative for the Windy Mountain Management Unit is to proceed with land ownership adjustments based on analysis and recommendations by the Western Slope Emergency District (ownership Alternative B). Recreation and public purpose permits would be issued on a case-by-case basis (Alternative A). Public lands within the unit would be avoided when locating major utility systems (modified Alternative C).</p> <p>The preferred alternative for the Sapara Area Management Unit is to retain 14 tracts in public ownership and consider 17 tracts for disposal through sale or exchange (modified Alternative C). Recreation and public purpose permits would be issued on a case-by-case basis (Alternative A). Public lands would be open for utility systems on a demand basis, but the systems would be concentrated in existing corridors whenever possible (Alternative A).</p>

# Alternatives Including the Preferred Alternative

TABLE 2-2

## Alternative A

## Alternative B

## Alternative C

## Preferred Alternative

Proposals for disposal or exchange received in the future would be considered on a case-by-case basis. If a given proposal were determined to be consistent with the regulations of this BLM, it would be approved without preparing a planning amendment.

### V. Recreation Management

Under Alternative A, no special recreation management actions would be undertaken in the Lander Shreve, Red Canyon, Bush Pass, Davis Meadows, Whiskey Mountain, or Daniels Area management units.

In the remaining units, management would be directed at the maintenance of existing recreational facilities. These include existing campgrounds in the Bush Pass unit, the campground and picnic site in the Green Mountain unit, the Split Rock Interpretive site in the Beaver Creek unit, and the Devil's Caul Interpretive site and Charlie Gardens picnic site in the Oak Hills unit.

Under this alternative, existing recreational facilities would be maintained in the Bush Pass, Green Mountain, Beaver Creek, and Oak Hills management units as described under this alternative, and no special recreation management actions would be undertaken in the Bush Pass, Davis Meadows, and Daniels Area management units. In addition, the number of commercial guide and outfitter camps would be limited in the Lander Shreve, Red Canyon, and Bush Pass management units under Alternative B. In guide and outfitter camps would be permitted in the Whiskey Mountain unit. Interpretive displays would be developed for the Red Canyon National Natural Landmark in the Red Canyon unit, the Devil's Caul picnic site in the Oak Hills unit, and Reddy Ridge and Miner's Delight in the Bush Pass unit.

The Red Canyon elk winter range would be closed to all winter activities from December to March, and BLM would cooperate with the Wyoming Game and Fish Department in the management of visitor use for wildlife viewing in the Whiskey Mountain unit. Increased management in the South Pass unit would be directed at maintaining historical sites and the trail, open space characteristics of the area. No new campgrounds would be developed; existing landside open spaces, etc.) would be fenced, and trails would not be upgraded.

Under this alternative, existing recreational facilities would be maintained in the Bush Pass, Green Mountain, Beaver Creek, and Oak Hills management units as described under Alternative A, and no other special recreation management actions would be undertaken in any management units except Green Mountain and Red Canyon.

In the Green Mountain Management Unit, the number of commercial hunting camps would be limited; landside on public safety (roads, trails, etc.) would be eliminated and declined when appropriate aesthetic values would be enhanced through exclusion of disturbed areas; road construction would be minimized; and management would be directed at maintaining a healthy, diverse forest.

In the Red Canyon unit, no commercial hunting camps would be allowed.

Alternative A is the preferred alternative for the Beaver Creek, Oak Hills, Bush Pass, Davis Meadows, and Daniels Area management units. Management would be directed at maintenance of existing facilities (Split Rock Interpretive site, Devil's Caul Interpretive site, and Charlie Gardens picnic site) in the Beaver Creek and Oak Hills management units. In special recreation management actions would be undertaken in the Bush Pass, Davis Meadows, and Daniels Area management units.

Alternative B is the preferred alternative in the Lander Shreve, Bush Pass, Whiskey Mountain, and Red Canyon management units. In the Lander Shreve, Bush Pass, and Red Canyon management units, the number of commercial guide and outfitter camps would be limited, and no guide and outfitter camps would be permitted in the Whiskey Mountain unit. BLM would cooperate with the Wyoming Game and Fish Department in the management of visitor use for wildlife viewing in the Whiskey Mountain unit, and the Red Canyon unit would be closed to all winter recreational activities from December to March. In the South Pass unit, management would be directed at the maintenance of existing campgrounds, historical sites, and the trail, open space characteristics of the area. No new campgrounds would be developed in this unit; existing landside open spaces, etc.) would be fenced, and roads would not be upgraded.

Interpretive displays would be developed for Reddy Ridge and Miner's Delight in the South Pass unit and for the Red Canyon National Natural Landmark in the Red Canyon unit.

Alternative C would be the preferred alternative for the Green Mountain Management Unit. The number of commercial hunting camps would be limited; landside on public safety (roads, trails, etc.) would be eliminated and declined when appropriate aesthetic values would be enhanced through exclusion of disturbed areas; road construction would be minimized; and management would be directed at maintaining a healthy, diverse forest.

# Alternatives Including the Preferred Alternative

OWC 2-2

## Alternative A

### VI. Off-road Vehicles (ORV)

ORV would be allowed on certain restrictions on all management units. In the Green Mountain, Lander Slope, and Red Canyon management units, vehicular traffic would be restricted to designated roads and vehicle routes. In addition, these units would be closed to traffic from December 1 to June, with the exception of snowmobiles on the Lander Slope and Green Mountain management units.

Vehicular traffic would be limited to existing roads and vehicle routes on the Beaver Creek and South Pass management units. On the Dais Hill, East Rock, North Hillside, and Whiskey Mountain management units, no ORV designation would be made. The Dais Hill would be open to off-road vehicle use (see map 2-6).

## Alternative B

All management units would permit snow ORV use, except the Dais Hill and Lander Slope, which would be closed to off-road vehicle use. ORV management units would be restricted to designated roads and vehicle routes. In addition, the Green Mountain, Lander Slope, and Red Canyon units would be closed to traffic from December 1 to June, with the exception of snowmobile traffic on the Green Mountain and Lander Slope units. The East Rock unit would be closed to all traffic from December 1 to May 1. On the Beaver Creek, South Pass, Dais Hill, and Whiskey Mountain management units, ORV use would be limited to existing roads and vehicle routes.

On the Whiskey Mountain Management Unit, ORV use would be limited to designated roads and vehicle routes with seasonal road closures. Seasonal closures would be used in some areas; other areas would be closed all year, and some areas would remain open for viewing bighorn sheep.

## Alternative C

Snow ORV use would be permitted in all management units. On the Green Mountain and Red Canyon management units, vehicular traffic would be restricted to designated roads and vehicle routes. These units would be closed to traffic from December 1 to June, with the exception of snowmobile traffic on the Green Mountain unit.

ORV traffic would be limited to existing roads and trails on the Beaver Creek, Lander Slope, South Pass, Dais Hill, and East Rock management units. The Charlie Garden rock outcrop would be closed to ORV use in the Dais Hill Management Unit.

The Dais Hill, Whiskey Mountain, and Dais Hill Management Unit, ORV use would be limited to designated roads and vehicle routes. The Dais Hill unit would be closed to ORV use from December 1 to April 30.

## Preferred Alternative

All management units would permit snow ORV use with the exception of the Dais Hill unit, which would be closed to off-road vehicle use. The Green Mountain, Lander Slope, and Red Canyon management units would permit ORV use on designated roads and vehicle routes. Units would be closed from December 1 to June 15 on the Lander Slope unit, and from December 1 to June 15 on the Red Canyon unit. In addition, snowmobile traffic would be permitted on the Green Mountain and Lander Slope units during periods of road closures.

ORV use would be limited to existing roads and vehicle routes on the Beaver Creek, South Pass, Dais Hill, East Rock, and Whiskey Mountain management units. In addition, ORV use would not be permitted on the Charlie Garden outcrop in the Dais Hill Management Unit.

On the Whiskey Mountain Management Unit, ORV use would be limited to designated roads and vehicle routes with seasonal road closures. Seasonal closures would be used in some areas; other areas would be closed all year, and some areas would remain open for viewing bighorn sheep.

### VII. Cultural/Natural History

No special management actions would be taken on the Green Mountain, Lander Slope, East Rock, North Hillside, Whiskey Mountain, and Dais Hill management units. All actions would be consistent with the Oregon/Nez Perce Trail Management Plan. Preservation of the Red Canyon National Natural Landscape would continue by sign and through voluntary actions by private landowners who have signed preservation agreements.

A management plan for the South Pass Historic Mining area, in the South Pass Management Unit, would be written to include fencing for preservation of riparian areas. In addition, sites would be permitted to decrease vandalism, and all land use on public lands would conform to the historical zoning in section 20 around South Pass City.

No special management actions would be taken on the Green Mountain, Lander Slope, East Rock, North Hillside, Whiskey Mountain, and Dais Hill management units.

On the Beaver Creek Management Unit, regulations would be undertaken with the Management Plan. Landowner acquisition of property at the Burn Ranch historical site and designation and enforcement of the Beaver Creek National Natural Landscape (NCL) would be pursued with the National Park Service.

A management plan for the proposed South Pass National Register Mining District, in the South Pass Management Unit, would be written. This plan would include recommendations for preserving all significant historical sites through stabilization, fencing, chemical treatment of wood, recording sites, and curating sensitive resources in an accelerated context. Historical sites would be permitted to decrease vandalism and all land use on public lands would conform with historical zoning in section 20 around South Pass City.

A management plan for the South Pass Historic Mining area, in the South Pass Management Unit, would be written. This plan would include recommendations for preservation of all significant historical sites through stabilization, fencing, chemical treatment of wood, recording of sites, and curating of sensitive resources on an accelerated basis. In addition, sites would be permitted to decrease vandalism and all land use on public lands would conform with historical zoning in section 20 around South Pass City.

No special management actions would be taken on the Green Mountain, Lander Slope, East Rock, North Hillside, Whiskey Mountain, and Dais Hill management units. All actions on the Beaver Creek and the Dais Hill Management Unit would be consistent with the Oregon/Nez Perce Trail Management Plan. Preservation of the Red Canyon National Natural Landscape would continue by sign and through voluntary actions by private landowners who have signed preservation agreements.

A management plan for the proposed South Pass National Register Mining District, in the South Pass Management Unit, would be written. This plan would include recommendations for preserving all significant historical sites through stabilization, fencing, chemical treatment of wood, recording sites, and curating sensitive resources in an accelerated context. Historical sites would be permitted to decrease vandalism and all land use on public lands would conform with historical zoning in section 20 around South Pass City. In addition, limited excavation would be conducted at sites of bighorn sheep to facilitate investigation of the site.

No special actions beyond standard management practices for protection and maintenance of cultural/natural history resources would be taken on the Green Mountain, Lander Slope, East Rock, North Hillside, Whiskey Mountain, and Dais Hill management units. Two cultural resources and one historic natural history resource would be affected in the Beaver Creek Management Unit. The two recommendations for cultural resources are to negotiate with the landowner on acquisition of property at the Burn Ranch historical site and to pursue National Natural Landscape (NCL) designation and enforcement of the Beaver Creek National Natural Landscape. In addition, all actions would be consistent with the Oregon/Nez Perce Trail Management Plan. These recommendations would provide for long-term preservation and maintenance of highly important National Register eligible cultural resources and protection of natural values at Beaver Creek.

Preservation of the Red Canyon National Natural Landscape would continue by sign and by voluntary efforts of private landowners who have signed preservation agreements.

A management plan would be written for the South Pass Historic Mining area in the South Pass Management Unit. This plan would include recommendations for protection of all significant historical areas

# Alternatives Including the Preferred Alternative

Table 3-2

## Alternative A

All actions on the Oak Hills management unit would be consistent with the Oregon/Manzanita Trail Management Plan. A management plan would be written for the Charlie Cardona rock art and picnic area. This plan would provide for installing walkways to retard erosion and building fences to protect the rock art.

A management plan would be written for the Warm Springs Canyon area in the Dakota Area Management Unit. This plan would be written following a stabilization feasibility study for the Warm Springs Canyon Flare.

## Alternative B

## Alternative C

## Preferred Alternative

through stabilization, fencing, chemical treatment of wood, reconstruction of artifacts, and creation of sensitive resources on an accelerated basis. Sites would be protected to decrease vandalism, and all land use on public lands would conform with historical zoning in section 23 about South Pass City. In addition, limited road excavation would be conducted and site interpretation encouraged at Miner's Delight Township. These recommendations would provide accelerated stabilization and protection of all significant historical sites located within the South Pass Historic Mining Area. Conformance with a local municipal zoning ordinance around South Pass City by BLM would avoid adverse impact to this National Register Historical Site. Limited road excavations within Miner's Delight Township would facilitate interpretation of the site for public benefit. All actions on the Oak Hills Management Unit would be consistent with the Oregon/Manzanita Trail Management Plan. A management plan would be written for the Charlie Cardona rock art and picnic area. This plan would include installing walkways to retard erosion and building fences to protect the rock art. These recommendations would continue long-standing past efforts of BLM to preserve and encourage public enjoyment of the Oregon/Manzanita Trail and minimize degradation of a nationally significant prehistoric rock-art site. The Dakota Area Management Unit would have a management plan written for the Warm Springs Canyon area. This plan would be written following a stabilization feasibility study for the Warm Springs Canyon Flare. These recommendations would begin the process of protecting the important cultural and natural history resources of the Warm Springs Canyon from natural weathering and minor vandalism.

## Wildfire Management

In all management units, full suppression would be recommended with no specific equipment or fire-fighting restrictions. Restricted burns would be allowed.

In all management units, full suppression with limited or restricted use of heavy equipment would be recommended. Heavier equipment would be used after the initial fire-fighting attack would depend on the escaped fire analysis. The objective would be to implement an aggressive initial attack with all available resources except heavy equipment to suppress wildfires as quickly as possible, with as little surface disturbance as possible.

Classed suppression would be recommended in all management units. Specific suppression actions would be included in a limited suppression plan. Suppression would occur when the fire exceeded or had the potential to exceed the size specified in the plan, or threatened private property, other non-man structures, and/or human life. Prescribed burns would be allowed.

Full or limited suppression would be recommended in all management units. Full suppression with limited or restricted use of heavy equipment would be recommended on the Green Mountains, Lewis Slips, and Red Canyon management units. In these units, the use of heavy equipment after the initial fire-fighting attack would depend on the escaped fire analysis. The objective would be to implement an aggressive initial attack with all available resources, except heavy equipment, to suppress wildfires as quickly as possible with as little surface disturbance as possible.

## Alternatives Including the Preferred Alternative

TABLE 2-2

### Alternative A

### Alternative B

### Alternative C

### Preferred Alternative

Fire suppression actions on the Gas Hills Management Unit would be determined by the occurrence of fires in specific suppression zones. Such zone and its corresponding suppression measures are as follows (see map 2-25 in Chapter VII).

Zone 1. Full suppression with limited use of heavy equipment would be recommended. This would mean that any wildfire would be fought immediately, using all available resources, with the exception of heavy equipment. If the fire were not controlled in the first burning period, the escaped fire analysis would be used to determine whether heavy equipment should be used to supplement other fire-fighting resources. The objective of this alternative would be to fully suppress all wildfires, since a large amount of private property and state lands could be damaged as a result of wildfires started on non-administered lands.

Zone 2. Limited suppression would be recommended for this zone. Specific suppression actions would be included in a limited suppression plan. Suppression would occur when the fire exceeded or had the potential to exceed the area specified in the plan, and/or threatened private property, other non-made structures, and/or human life.

Zone 3. Full suppression with limited use of heavy equipment would also be recommended for this zone. This would mean that an aggressive initial attack using all resources available, with the exception of heavy equipment, would be allowed. After the initial fire-fighting attack, the decision to use heavy equipment would be based on the escaped fire analysis. The objective of this alternative would be to fully suppress all wildfires without causing unnecessary resource damage.

Fire suppression actions on the Beaver Creek Management Unit would be determined by the occurrence of fire in suppression zones. Such zone and its corresponding suppression measures follow (see map 2-16 in Chapter VI).

Zone 1. Full suppression with limited use of heavy equipment would be recommended. This would mean that any wildfire would be fought immediately using all available resources, with the exception of heavy equipment. If the fire was not controlled in the first burning period, the escaped fire analysis would be used to determine whether heavy equipment should be used to supplement other fire-fighting resources. The objective of this alternative would be to fully suppress all wildfires, since a large amount of private property and state lands could be damaged as a result of wildfires started on non-administered lands.



# Alternatives Including the Preferred Alternative

DWLS 2-2

## Alternative A

## Alternative B

## Alternative C

## Preferred Alternative

Zone 2. Limited suppression would be recommended for this zone. Specific suppression actions would be included in a limited plan. Suppression would occur when the fire exceeded or had the potential to exceed the size specified in the plan; threaten private property or other named structure, and/or human life.

Zone 3. Limited suppression would also be recommended for this zone (see zone 2).

Full suppression with no specific equipment or fire-fighting restrictions would be recommended on the South Fork, Bear River, Oxbow Meadows, Beaver Area and Whiskey Mountain management units. Prescribed burns would be allowed on all management units.

## IX. Access

The existing transportation system would be maintained in all management units.

The existing road transportation system would be maintained for all management units in the same manner as Alternative A. In addition, negotiations would be initiated with private landowners to obtain easements for public access on roads in the following management units:

1. Green Mountain
  - a) Willow Creek Road
  - b) Cooke Mountain Road
  - c) Dwyer Meadow Road
2. Beaver Creek
  - a) Bear Beaver Creek Road
  - b) Twin Creek Road
  - c) Government Saw Road
  - d) Shiner Ridge Road
  - e) Hudson-Watkins City Road
  - f) Beaver Run Road
  - g) Wolf Gap Road
  - h) Reed Gap Road
  - i) Dilsbaugh Butte Road
3. Lander Slope
  - a) Hornum Basin Road
4. Gas Hills
  - a) Copper Mountain Road
5. Daboia Area
  - a) Dwyer Creek Road

Under this alternative, the existing transportation system would be maintained in all management units as described under Alternative A.

Alternative A is the preferred alternative for the Red Canyon, South Fork, Bear River, Oxbow Meadows, and Whiskey Mountain management units. Under the Preferred Alternative, the existing transportation system would be maintained in these units.

Alternative B is the Preferred Alternative in the Green Mountain, Beaver Creek, Lander Slope, Gas Hills, and Daboia Area management units. Negotiations would be initiated with private landowners to obtain easements on roads in these management units as follows:

1. Green Mountain
  - a) Willow Creek Road
  - b) Cooke Mountain Road
  - c) Dwyer Meadow Road
2. Beaver Creek
  - a) Bear Beaver Creek Road
  - b) Twin Creek Road
  - c) Government Saw Road
  - d) Shiner Ridge Road
  - e) Hudson-Watkins City Road
  - f) Beaver Run Road
  - g) Wolf Gap Road
  - h) Reed Gap Road
  - i) Dilsbaugh Butte Road
3. Lander Slope
  - a) Hornum Basin Road
4. Gas Hills
  - a) Copper Mountain Road
5. Daboia Area
  - a) Dwyer Creek Road

## Alternatives Including the Preferred Alternative

TABLE 2-3

SUMMARY OF MANAGEMENT ACTIONS AND ENVIRONMENTAL CONSEQUENCES BY ALTERNATIVE

Alternative A	Alternative B	Alternative C	Preferred Alternative
I. Energy and Minerals			
a) Oil and Gas			
<p>The following acreage figures indicate the approximate acreage of the total Federal mineral estate by alternative within the resource area that would be: 1) open to oil and gas leasing, exploration and development; 2) closed to oil and gas leasing, exploration and development; 3) the portion of the resource area that would be open to leasing with a no-surface occupancy (NSO) restriction; 4) that portion of the area that would be open to leasing with seasonal restrictions; 5) acreage currently within the Wilderness Study Areas; and 5) the area within current WSA proposed for wilderness designation.</p>			
Open to Leasing 2,421,000	Open to Leasing 2,499,000	Open to Leasing 2,500,000	Open to Leasing 2,460,000
NSO restriction* 65,000	NSO restriction* 99,000	NSO restriction* 79,000	NSO restriction* 171,000
Seasonal restriction* 665,000	Seasonal restriction* 732,000	Seasonal restriction 577,000	Seasonal restriction 566,000
Closed to Leasing** 79,000	Closed to Leasing 1,000	Closed to Leasing -0-	Closed to Leasing -0-
Wilderness Study Areas*** 48,000	Wilderness Study Areas 48,000	Wilderness Study Areas 48,000	Wilderness Study Areas 48,000
			Wilderness 6,000

Under this alternative, management of the oil and gas mineral estate would continue as it is today. This alternative does not provide for protection against potential drainage of the Federal oil and gas reserves in the Buxton Management Unit. In addition, seasonal and no-surface occupancy restrictions would be applied to all exploration and development operations irrespective of the oil and gas potential occurrence rating of the area.

This alternative maximizes the area open to oil and gas leasing as does Alternative C, but does not offer the flexibility to reduce the amount of restriction imposed upon exploration and development operations that is offered by Alternative C and the preferred alternative.

Under this alternative, as the rating for the potential occurrence of oil and gas elevates from low to moderate, to high, the restrictions that would be imposed upon oil and gas exploration and development operations would decrease to the point that only those restrictions necessary to protect threatened and endangered plants and animal species or nationally significant cultural resources would be imposed upon exploration and development operations in areas of high potential for oil and gas occurrence.

Under this alternative, all but three management units, Whiskey Mountain, Dubois Baldlands, and Buxton would be managed similarly to Alternative C. However, as the rating for the potential occurrence of oil and gas elevates from moderate to high, only those seasonal and no-surface occupancy restrictions necessary to protect significant resource values would be imposed on exploration and development operations. In addition, either upon showing by the operator or upon determination by the BLM that the adverse effects to other significant resources can be adequately mitigated, by acceptable plans of development, lease restrictions designed to protect these resources can be waived by the BLM. Under this alternative, oil and gas leases issued in the Buxton and Whiskey Mountain management units would include no-surface-occupancy restrictions.

This alternative allows for the most management flexibility in terms of enhancement of specific programs or resources based on this respective potential or significance. As the potential increases or decreases, the management actions can be modified to enhance or de-emphasize management for that resource.

\* The no-surface occupancy and seasonal restriction acreage figures are estimates that we feel depict the maximum acreage that could potentially be affected due to specific management actions delineated in each alternative. The majority of the NSO acreage (approximately 90 percent) is associated with Wyoming BLM's standards stipulations for areas with steep slopes, water resources, etc. The remaining 10 percent is associated with specific areas or resources such as the Oregon/Idaho National Historic Trail.

\*\* This does not include the area encompassed by current WSA on the areas proposed for wilderness designation.

\*\*\* Depicts the approximate acreage within the Wilderness Study areas that would be managed under the interim management guidelines for WSA until final determinations are made regarding wilderness designation.

## Alternatives Including the Preferred Alternative

TABLE 2-3 (Continued)

Alternative A	Alternative B	Alternative C	Preferred Alternative		
b) Locatable Minerals					
The following acreage figures indicate the approximate acreage of the total federal mineral estate by alternative, within the resource area that would be: 1) open to appropriations under the mining laws, 2) withdrawn from appropriations under the mining laws, 3) that portion of the area open to appropriations under the mining laws where an operator would be required to file a plan of operations for all exploration activities (except casual use) and development activities, 4) Wilderness Study Areas, 5) that portion of the Wilderness Study Areas that would be proposed for wilderness designation.					
Open to appropriation Plan of Operation required Withdrawn* Wilderness Study Areas**	2,687,000  2,000 13,000 48,000	Open to appropriation Plan of Operation required* Withdrawn Wilderness Study Areas	2,499,200  15,000 1,000 48,000	Open to appropriations Plan of Operation required Withdrawn Wilderness Study Areas Wilderness	2,480,000  110,000 28,000 48,000 6,000
The acreage estimate of the area affected by the requirement of a plan of operations is the maximum area we feel could potentially be affected.			This alternative offers the maximum opportunity for locatable mineral exploration and development operations within the resource area.		The acreage estimate of the area affected by the requirement of a plan of operations is the maximum area we believe could potentially be affected. This acreage figure should be reduced when the areas within the Red Canyon and Lander Slope Management units, and other areas needing this level of protection are further defined during implementation of this plan.

\* The acreages in this category do not include Wilderness Study Areas or the one area proposed for wilderness designation.

\*\* This depicts the approximate acreage that would be managed under the interim management guidelines for WSA until final wilderness designation.

### c) Phosphates

No new prospecting, exploration and development, or leasing would be allowed.

Same as Alternative A.

The entire resource area would be open for prospecting, exploration and development, and leasing.

Modified Alternative C. The entire resource area would be open for prospecting, exploration and development, and leasing with the standard protective measures for surface-disturbing activities (see Appendix 2).

### II. Fish and Wildlife

Fish and wildlife habitats in five management units, totaling approximately 90,000 acres, are fully protected from the impacts of oil and gas exploration, development and production. Habitat in five management units totaling approximately 2,674,000 acres are open to oil and gas operations except for streams, riparian areas, steep slopes and about 53,000 acres of other important habitats protected by no-surface occupancy restrictions. Raptors, sage grouse and big game are protected during critical periods by seasonal restrictions.

Fish and wildlife habitats in ten management units, about 2,764,000 acres, would be subject to impacts of oil and gas exploration, development and production except for streams, riparian areas, steep areas and about 76,000 acres of other important habitats protected by no-surface occupancy restrictions. Seasonal restrictions would protect raptors, sage grouse nesting and big game during critical periods.

Fish and wildlife habitats in ten management units would be subject to the impacts of oil and gas exploration, development and production. In six management areas, totaling approximately 105,000 acres, steep areas and about 5,800 acres of other important habitats would be protected by no-surface occupancy restrictions. Raptors, sage grouse nesting and big game would be protected during critical periods by seasonal restrictions. Four management units totaling approximately 2,659,000 acres are open to oil and gas exploration and development except for streams, riparian areas, steep slopes and nesting areas, raptor nest sites, calving areas and big game winter ranges. Protection afforded by no-surface occupancy and seasonal restrictions would be significantly reduced on about 45,000 acres with high oil and gas potential.

Fish and wildlife habitat in the Windy Mountain and Lost Rock Management Units, about 23,485 acres, would be fully protected from the impacts of oil and gas exploration, development and production. Habitat in four management units, totaling approximately 83,000 acres, would be open to oil and gas operations except for streams, riparian areas, steep slopes and about 27,000 acres of other important habitats protected by no-surface occupancy restrictions. Raptors, sage grouse and big game in these units would be protected during critical periods by seasonal restrictions. In four other management units, in habitats totaling about 2,640,000 acres, protection of streams, riparian areas, sage grouse breeding and nesting areas, raptor nests, elk calving areas and big game winter ranges, afforded by no-surface occupancy and seasonal restrictions, could be significantly reduced on about 45,000 acres of high oil and gas potential.

## Alternatives Including the Preferred Alternative

TABLE 2-3 (Continued)

Alternative A	Alternative B	Alternative C	Preferred Alternative
<p>Fish and wildlife habitats in all management units are subject to the effects of locatable mineral exploration and development with the exception of about 10,000 acres presently under segregation or withdrawal. Special fish and wildlife program management and improvement plans will progress in five areas. Forest/Woodland management will actively incorporate wildlife habitat improvement in three areas.</p>	<p>Fish and wildlife habitats in six management areas, totaling approximately 105,000 acres, would be fully protected from the impacts of locatable mineral exploration and development. Habitats in four management units, totaling about 2,659,000 acres, would be subject to the effects of locatable mineral exploration and development with the exception of about 12,000 acres which would be under withdrawal.</p>	<p>Fish and wildlife habitat on about 63,000 acres in the Lander Slope and Red Canyon Management Units would be subject to effects of phosphate prospecting and mining operations.</p>	<p>Fish and wildlife habitat in the Lander Slope and Red Canyon Management Units would be protected from the adverse effects of phosphate prospecting or development operations except for operations on existing, valid leases.</p>
	<p>Fish and wildlife habitat management would be emphasized and receive objective oriented management through habitat management plans or other activity plans, cooperative management agreements, etc. in six areas.</p>	<p>Fish and wildlife habitat management would be emphasized and receive objective oriented management plans or other activity plans, cooperative management agreements, etc. in nine areas.</p>	<p>Prescribed fire could be used in all management areas. Fish and wildlife habitat overall would be more positively than negatively affected by this approach.</p>
III. Forest Management			
<p>Harvest of 1.3 MBF of sawtimber and 1.7 MBF of firewood per year and management of 14,500 acres would enhance timber condition by salvaging dead timber killed in beetle epidemics.</p>	<p>Intensive management of 16,000 acres would enhance timber resource base.</p> <p>Harvest of 12 MBF per year would enhance resource by salvaging dead timber and increasing growth rates.</p> <p>Could have potential negative effect on local industry by depleting resource too quickly.</p> <p>Management of 1,500 acres of Lander Slope (300 acres per year) would enhance resource base.</p>	<p>Intensive management of 18,000 acres of conifer and 1,300 acres of aspen would enhance resource base.</p> <p>Yearly harvest of about 6 MBF will significantly reduce resource loss to old age, disease and insects.</p> <p>Intensive management of 13,000 acres on Green Mountain would enhance resource base by creating a diverse aged forest which will reduce greatly chances of future insect epidemics.</p>	<p>Intensive management of 13,000 acres on Green Mountain under a compartment concept would enhance the resource base by salvaging dead timber and increasing growth rates. This alternative would separate harvested areas to create unweeded forest which will reduce chances of beetle epidemics.</p> <p>Intensive management of 4,600 acres on Lander Slope would enhance resource base (300 acres of disturbance per year) by increasing growth rates and creating an unweeded forest for enhancement of wildlife habitat and reduction of insect epidemic potential.</p> <p>Intensive management of 3,000 acres at South Pass and Dubois would enhance resource base by increasing growth rates with cultural work.</p> <p>Yearly harvest of approximately 6.2 MBF will reduce the resource loss from old age, disease and insects.</p> <p>Intensive management of all focused areas include utilizing cultural treatments as necessary to increase growth rates and sustain the allowable harvest volume.</p>
IV. Lands			
a) Landownership Adjustments			
No impacts.	No impacts.	Potential sale or exchange of 22,146 acres (161 tracts.)	Potential sale or exchange of 11,042 acres (101 tracts).
			Retain 11,563 acres (63 tracts).

## Alternatives Including the Preferred Alternative

TABLE 2-3 (Continued)

Alternative A	Alternative B	Alternative C	Preferred Alternative
b) Utility Systems			
The following resource management units would be open to major utility systems:	The following resource management units would be open to major utility systems:	The following resource management units would be open to major utility systems:	The following resource management units would be open to major utility systems:
1) Green Mountain	1) Green Mountain	1) Green Mountain	1) Green Mountain
2) Beaver Creek	2) Beaver Creek	2) Beaver Creek	2) Dubois
3) Red Canyon	3) Gas Hills	3) Lander Slope	3) Beaver Creek (with some avoidance areas)
4) South Pass	4) Whiskey Mountain	4) Red Canyon	4) Gas Hills (with some avoidance areas)
5) Gas Hills	5) Dubois	5) Gas Hills	
6) Dubois Badlands		6) Dubois Badlands	
7) Whiskey Mountain		7) Dubois	
8) Dubois			
The following resource management units would be closed to major utility systems:	The following resource management units would be closed to major utility systems:	The following resource management units would be closed to major utility systems:	The following resource management units would be closed to major utility systems:
1) Lander Slope	1) Lander Slope	1) South Pass	1) Red Canyon
2) East Fork	2) Red Canyon	2) East Fork	2) Dubois Badlands
	3) South Pass	3) Whiskey Mountain	3) Lander Slope
	4) East Fork		4) South Pass
	5) Dubois Badlands		5) Whiskey Mountain
			6) East Fork
V. Recreation			
Eleven recreation management areas would be managed to protect recreation and scenic values. RGS and VMT guidelines are provided.	Same impacts as Alternative A.	Same impacts as Alternative A.	Would maintain recreation and scenic values on 3 special recreation management areas containing 51,440 acres and 7 extensive recreation management areas.
Recreation and visual resource management would generally be status quo. Seven developed sites would be maintained.	Additional interpretation is provided for the Oregon/Monmon Trail and Castle Gardens.	Provide a habitat reduction effort on Green Mountain. Allocate big game hunting camps for Green Mountain, Lander Slope, Red Canyon, and Dubois Areas.	Maintain 7 developed recreation sites. Provide additional interpretation for the Oregon/Monmon Trail and
Fish and wildlife habitat in the Lander Slope and Red Canyon Management Units would be protected from the effects of phosphate prospecting or development operations except for operations on existing, valid leases.	Fish and wildlife habitat in the Lander Slope and Red Canyon Management Units would be protected from the effects of phosphate prospecting or development operations except for operations on existing, valid leases.	Fish and wildlife habitats in all ten management units would be subject to the impacts of locatable mineral exploration and development, with the exception of about 600 acres around campgrounds and historical sites. Some impacts on habitat could be reduced as a result of mining plan requirements on about 15,000 acres in the South Pass Management Unit.	Fish and wildlife habitat in the Whiskey Mountain and East Fork Management Units, about 20,485 acres, would be fully protected from the impacts of locatable mineral exploration and development. Fish and wildlife habitat in eight other management units, totaling about 2,743,000 acres, are subject to the effects of locatable mineral operations with the exception of about 4,900 acres which would be under withdrawal. Mining plan requirements on about 116,000 acres could reduce some of the potentially negative impacts on fish and wildlife habitats.
Fish and wildlife habitat management is largely diffused throughout the resource area with four areas receiving program emphasis and objective oriented management (areas with activity plans, cooperative management agreements, etc., incorporating significant wildlife management objectives.)	Special fish and wildlife program management and improvement plans would be implemented or continued in five areas including a habitat management plan for bighorn sheep reintroduced in the Sweetwater Rocks. Forest/woodland management will actively incorporate wildlife habitat improvement in these areas.	Special fish and wildlife program management and improvement plans would be implemented or continued in eight areas. Forest/woodland management will actively incorporate wildlife habitat improvement in six areas.	Special fish and wildlife program management and improvement plans would be implemented or continued in eleven areas. Forest/woodland management will actively incorporate wildlife habitat improvement in seven areas.

## Alternatives Including the Preferred Alternative

TABLE 2-3 (Continued)

Alternative A	Alternative B	Alternative C	Preferred Alternative
<p>Off-road vehicle restrictions reduce habitat damage in five management units and reduce winter disturbance of wildlife in three units. Wildlife, which can both negatively and positively affect fish and wildlife habitat, are fully suppressed in all management units.</p>	<p>Off-road vehicle restrictions would reduce habitat damage in all ten management units and reduce winter disturbance of wildlife in five management units. Wildlife, which can both negatively and positively affect fish and wildlife habitat, will be fully suppressed in all management units but restrictions would be placed on the use of habitat damaging heavy equipment use in all ten management areas. Interpretive services are added for Red Canyon NNL and Beaver Rim.</p> <p>Impose a winter sports closure for Red Canyon big winter range. Plan no developments in South Pass or at Stony Point.</p>	<p>Off-road vehicle restrictions reduce habitat damage in eight management units and reduce winter disturbance of wildlife in four units. Fire management could incorporate limited suppression plans in all management units, whereby some fires could be allowed to burn to improve wildlife habitat and equipment restrictions could be used to prevent habitat damage.</p>	<p>Off-road vehicle restrictions would reduce habitat damage in nine management units and, through closure, prevent habitat damage in the Dubois Badlands. Seasonal restrictions would reduce winter disturbance of wildlife in four management units. Fire management would incorporate combinations of full suppression, full suppression with equipment restrictions, and limited suppression in different parts of the resource area. Castle Gardens. Add interpretive services for Red Canyon NNL. Close the Red Canyon big game winter range to winter sports. No new developments are planned. Initiate a reduction of hazards on Green Mountain. Establish criteria for allocating special recreation permits.</p>
<p>VI. Off-Road Vehicles</p> <p>Existing ORV designations would continue:</p> <ul style="list-style-type: none"> <li>- 95,880 acres limited to designated roads and vehicle routes (Green Mountain, Lander Slope, Red Canyon).</li> <li>- 1,011,738 acres limited to existing roads and vehicle routes.</li> </ul>	<p>ORV designations would be completed for all undesignated areas:</p> <ul style="list-style-type: none"> <li>- 4,330 acres limited to designated roads and vehicle routes (Whiskey Mountain).</li> <li>- 1,184,144 acres limited to existing roads and vehicle routes.</li> <li>- 4,400 acres closed (Dubois Badlands, Castle Gardens).</li> </ul>	<p>Existing ORV designations would be modified and the remaining area would be designated as follows:</p> <ul style="list-style-type: none"> <li>- 4,520 acres limited to designated roads and vehicle routes (Dubois Badlands).</li> <li>- 2,266,462 acres limited to existing roads and vehicle routes.</li> <li>- 31,730 acres open (Whiskey Mountain, Dubois).</li> <li>- 89 acres closed (Castle Gardens).</li> </ul>	<p>The entire resource area would be designated:</p> <ul style="list-style-type: none"> <li>- 100,110 acres limited to designated roads and vehicle routes (Green Mountain, Lander Slope, Red Canyon, Whiskey Mountain).</li> <li>- 2,197,882 acres limited to existing roads and vehicle routes.</li> <li>- 4,400 acres closed (Dubois Badlands, Castle Gardens).</li> </ul>
<p>VII. Cultural/Natural History Program</p> <p>1) Resources protected from:</p> <p>a) Oil and Gas Impacts (including no leasing and no-surface occupancy restrictions).</p> <ul style="list-style-type: none"> <li>- 13 individual sites/2,930 acres</li> <li>- Beaver Rim proposed NNL/1,120 acres</li> <li>- Red Canyon NNL/5,760 acres</li> <li>- Oregon/Mormon Trail corridor/26,950 acres</li> <li>- Total: 16 resources/36,760 acres</li> </ul>	<ul style="list-style-type: none"> <li>- 11 individual sites/4,320 acres</li> <li>- Beaver Rim proposed NNL/1,120 acres</li> <li>- Red Canyon NNL/5,760 acres</li> <li>- South Pass proposed National Register district/11,900 acres</li> <li>- Oregon/Mormon Trail corridor/26,950 acres</li> <li>- Total: 15 resources/50,050 acres</li> </ul>	<ul style="list-style-type: none"> <li>- 30 individual sites/4,945 acres</li> <li>- Beaver Rim proposed NNL/1,120 acres</li> <li>- Red Canyon NNL/5,760 acres</li> <li>- Oregon/Mormon Trail corridor/approximately 26,950 acres</li> <li>- Total: 33 resources/ 38,775 acres</li> </ul>	<ul style="list-style-type: none"> <li>- 11 individual sites/4,320 acres</li> <li>- Beaver Rim proposed NNL/1,120 acres</li> <li>- Red Canyon NNL/5,760 acres</li> <li>- South Pass proposed National Register district/11,900 acres (subject to adjustment)</li> <li>- Oregon/Mormon Trail corridor/26,950 acres</li> <li>- Total: 15 resources/50,050 acres</li> </ul>

## Alternatives Including the Preferred Alternative

TABLE 2-3 (Continued)

Alternative A	Alternative B	Alternative C	Preferred Alternative
b) Locatable Minerals (including withdrawals, and special plan of operations requirements)			
- 15 individual sites/3,060 acres	- 12 individual sites/4,690 acres - Beaver Run proposed NNL/1,120 acres - Red Canyon NNL/5,760 acres - South Pass proposed National Register district/11,900 acres - Oregon/Mormon Trail corridor/26,140 acres	- 6 individual sites/2,280 acres   - South Pass proposed National Register district/11,900 acres	- 12 individual sites/4,690 acres - Beaver Run proposed NNL/1,120 acres - Red Canyon NNL/5,760 acres - South Pass proposed National Register district/11,900 acres - Oregon/Mormon Trail corridor/26,140 acres
- Total: 15 resources/3,060 acres	- Total: 16 resources/49,160 acres	- Total: 7 resources/14,180 acres	- Total: 16 resources/49,160 acres
c) Landownership Adjustments and Utility System Impacts (including utility system restrictions)			
Parcels of Oregon/Mormon Trail/1,029 acres	- Parcels of Oregon/Mormon Trail/1,029 acres - Red Canyon NNL/5,760 acres  - South Pass proposed National Register district/11,900 acres	- Parcels of Oregon/Mormon Trail/869 acres - Red Canyon NNL/5,760 acres - Oregon/Mormon Trail corridor/26,950 acres - South Pass proposed National Register district/11,900 acres (subject to adjustment)	- 7 individual sites/2,840 acres - Parcels of Oregon/Mormon Trail/869 acres - Red Canyon NNL/5,760 acres - Oregon/Mormon Trail corridor/26,950 acres - South Pass proposed National Register district/11,900 acres (subject to adjustment)
- Total: 1 resource/1,029 acres	- Total: 3 resources/16,689 acres	- Total: 11 resources/11,900 acres	- Total: 11 resources/48,319 acres
d) Phosphates (including closures)			
- Red Canyon NNL/5,760 acres - Total: 1 resource/5,760 acres	- Red Canyon NNL/5,760 acres - Total: 1 resource/5,760 acres	- Total: 0 resources/0 acres	- Red Canyon NNL/5,760 acres - Total: 1 resource/5,760 acres
2) Resources Covered by Special Cultural/Natural History Program Protection Measures (includes special protective agreements, management plans, physical resources, studies, acquisitions, etc.)			
- 9 individual sites, the Oregon/Mormon Trail, Red Canyon NNL, and South Pass National Register district.	- 10 individual sites, the Oregon/Mormon Trail, Red Canyon NNL, South Pass proposed National Register district, and Beaver Run proposed NNL	- 9 individual sites, the Oregon/Mormon Trail, Red Canyon NNL, and the South Pass proposed National Register Mining District.	- 10 individual sites, the Oregon/Mormon Trail, Red Canyon NNL, South Pass proposed National Register district, and Beaver Run proposed NNL
- Total: 11 resources	- Total: 14 resources	- Total: 11 resources	- Total: 14 resources
VIII. Fire Management			
Full suppression of wildfires with no heavy equipment restrictions on 10% of public lands in IPA would provide protection of all resource values from fire damage.  Unrestricted heavy equipment use in some high resource value areas would cause undue environmental damages.  Prescribed fires in certain areas would enhance wildlife habitat, range, recreation, and forestry conditions.	Full suppression of wildfire with limited use of heavy ground equipment after initial attack on 10% of public lands would provide protection for all resource values while reducing potential environmental damages by fire-fighting equipment.  Prescribed fires in some areas would enhance wildlife habitat, range, recreation and forestry conditions.	Limited suppression of wildfires in all areas would enhance wildlife habitat, range, recreation and forestry values in some areas. However, it would increase the potential for excessive resource damage in some areas.  Limited suppression on certain areas would increase potential for damage to non-rare improvements.	Full suppression of wildfire with no heavy equipment restrictions on 4% of public lands would provide maximum protection for high value resources and non-rare improvements.  Full suppression of wildfires with limited heavy equipment use after initial attack on 50% of public lands would provide maximum protection of high value resources and non-rare improvements and also



## Alternatives Including the Preferred Alternative

TABLE 2-3 (Continued)

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
		Prescribed fires in certain areas would supplement benefits achieved by limited suppression of wildfires.	<p>reduce the potential for environmental damage by fire-fighting equipment.</p> <p>Limited suppression of wildfires on 40% of public lands would enhance wildlife habitat, range and recreation values in these areas.</p> <p>Prescribed fires in certain areas would enhance resource values where necessary.</p>
IX. Access			
No easements would be negotiated. Areas of limited access would continue to be inaccessible for management and public use.	Negotiations for 12 easements will provide public access and management where such use is restricted by mixed land ownership.	Same impacts as Alternative A.	Access easements would be sought as directed by the District Transportation Plan. As of 1985, the plan identifies twelve easements would be negotiated to enhance access to public lands for management and public access.
X. Wilderness			
48,000 acres in six WAs. Zero acres would be designated.	Same impacts as Alternative A.	Same impacts as Alternative A.	One WA recommended for wilderness designation - 6,000 acres.
XI. Grazing Management			
With the exception of the management actions described in the Grazing Supplement, none of the alternatives would cause significant impacts to livestock grazing. Cumulative impacts for livestock grazing are located on the following table.			Same impacts as Alternative A.

## Alternatives Including the Preferred Alternative

**TABLE 2-4**  
**COMPARISON OF CUMULATIVE IMPACTS**  
**FOR THE PROPOSED ACTION FOR GRAZING MANAGEMENT<sup>1</sup>**

	Short Term	Long Term
<b>I. SOILS AND WATERSHED</b>		
A. Green Mountain Grazing EIS Area	Short-term increases in sedimentation would be expected if vegetative manipulation projects were undertaken. Projects have been proposed on 26 allotments.	Expected impacts would be neutral on C allotments (12,000 acres) and neutral to beneficial on M and I allotments (1,181,600 acres).
B. Gas Hills Grazing EIS Area	In the worst case, sedimentation increases could occur on 17,000 acres where vegetative manipulation projects were feasible. In the best case, there would be no increase in sedimentation expected.	Impacts on M and C allotments (600,000 acres) would remain unchanged within acceptable limits. On I allotments (400,000 acres), general improvement would be
<b>II. VEGETATION</b>		
A. Green Mountain Grazing EIS Area	In the short term, vegetative production would continue at present levels. There could be some decline in condition of riparian areas before implementation of riparian areas.	Overall, long-term impacts would be neutral on C allotments (12,000 acres) and beneficial on M and I allotments (1,181,600).
B. Gas Hills Grazing EIS Area	On M allotments (540,000 acres), conditions would remain unchanged. C allotment (60,000 acres) areas in declining condition would continue to decline, and I allotment (400,000 acres) areas in declining condition would continue to decline until management actions were implemented expected.	On M allotments (540,000 acres), conditions would remain unchanged. C allotment (60,000 acres) areas in unsatisfactory condition would remain unchanged. On I allotments (400,000 acres), improvement in overall vegetative conditions could be
<b>III. SOCIOECONOMICS</b>		
A. Green Mountain Grazing EIS Area	On I allotments, impacts to individual livestock operator revenues would be detrimental in the short term. On M and C allotments, impacts would be neutral.	Impacts would be neutral on M and C allotment operators. Impacts would be beneficial on I allotments in the long term.
B. Gas Hills Grazing EIS Area	On M and C allotments, there would be essentially no impacts. On I allotments, there would generally be short-term reduction in revenue.	On M and C allotments, there would be essentially no impacts. On I allotments, overall impacts would be neutral to beneficial.
<b>IV. WILDLIFE</b>		
A. Green Mountain Grazing EIS Area	M and C allotment impacts would generally be neutral to beneficial. Habitat conditions would remain below potential on some riparian areas that were currently being overused. On I allotments, habitat conditions would remain below potential on areas that were being overused until management actions are implemented.	M and C allotment impacts would be neutral to beneficial; however, on some overused riparian areas, habitat condition would remain below potential. On I allotments, habitat conditions would generally improve. Nongame and small game would be expected to increase in abundance.

## Alternatives Including the Preferred Alternative

**TABLE 2-4 (Continued)**  
**COMPARISON OF CUMULATIVE IMPACTS**  
**FOR THE PROPOSED ACTION FOR GRAZING MANAGEMENT<sup>1</sup>**

		Short Term	Long Term
			ance. Impacts on big game would be variable, but generally would be beneficial if the suggested mitigative measures were followed.
B. Gas Hills Grazing EIS Area	On M allotments, short-term impacts would be negligible. On C and I allotments, areas of declining habitat condition would continue to decline.		On M allotments, habitat conditions are generally satisfactory, and no change is anticipated. On C allotments, areas that have been declining would continue to decline. On I allotments, impacts could vary, depending on the species and the proposed management action; however, this would generally be beneficial to wildlife, if suggested mitigative measures were followed.
<b>V. FISHERIES</b>			
A. Green Mountain Grazing EIS Area	No short-term impacts would be anticipated.		Category M and C allotment impacts would be largely neutral since a very small percentage (less than 2 percent) of the habitat falls within M and C allotments. Overall, impacts on I allotments would be positive due to new reservoir construction and improved streambank conditions in the long term.
B. Gas Hills Grazing EIS Area	Short-term effects on fisheries would be neutral.		Approximately 5.5 miles of trout stream, with some degree of livestock damage, occurs on public lands within the study area. Of this, approximately 3 miles occurs on M allotments. Little significant improvements could be expected on this area without a change in management. The remaining 2.5 miles occurring in I allotments would be expected to improve. Improvement in the available habitat could also be expected with construction of new stock-water reservoirs on I allotments.

## Alternatives Including the Preferred Alternative

**TABLE 2-4 (Continued)**  
**COMPARISON OF CUMULATIVE IMPACTS**  
**FOR THE PROPOSED ACTION FOR GRAZING MANAGEMENT<sup>1</sup>**

	Short Term	Long Term
<b>VI. WILD HORSES</b>		
A. Green Mountain Grazing EIS Area	No short-term impacts would be anticipated.	In the interim, wild horse numbers would be adjusted downward from 1,400 head to 490 head. All herds that existed before 1971 would remain as viable breeding populations. Numbers would be adjusted in the long term, based on monitoring results.
B. Gas Hills Grazing EIS Area	There would be no impacts. There are no wild horses in the Gas Hills area.	
<b>VII. CULTURAL</b>		
A. Green Mountain Grazing EIS Area	Impacts due to erosion and trampling would remain essentially unchanged, in the short term.	For M and C allotments, impacts would remain unchanged. On I allotments, beneficial impacts would result from slowed erosion rates.
B. Gas Hills Grazing EIS Area	No short-term impacts would be anticipated.	Management actions directed to improve or protect riparian areas could be beneficial to cultural resources.
<b>VIII. RECREATION</b>		
A. Green Mountain Grazing EIS Area	No short-term impacts would be anticipated.	Impacts would be negligible to both the visual resources and recreational opportunities, if suggested mitigative measures were followed.
B. Gas Hills Grazing EIS Area	No short-term impacts would be anticipated.	Overall impacts on recreational opportunities and visual resources would be minimal, if suggested mitigative measures were followed. Some beneficial impacts to recreation would occur, if vegetative conditions improved in riparian areas under this alternative.

<sup>1</sup> See Livestock Grazing Supplement.

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## CHAPTER III

# AFFECTED ENVIRONMENT

## INTRODUCTION

This chapter summarizes various physical, biological, and socioeconomic characteristics of the resource area that affect, or are affected by, resolution of the issues identified in Chapter 2. Much of the information contained in this chapter is extracted from the Lander Resource Area Management Situation Analysis (MSA), which is available for review at the Lander Resource Area office. The MSA includes more detailed material not duplicated in this RMP/EIS document, including a description of current management (summarized in this document in Chapter 2 in Alternative A and under Management Guidance Common to all Alternatives) and a discussion of the implications of current management. (For a summary of the affected environment by management units, see Chapter 5, Preferred Alternative and Rationale, and the Wilderness and Livestock Grazing supplements.)

## ENERGY AND MINERALS

### Geology

The Lander Resource Area lies within the regional geologic provinces of the Wyoming plains and Rocky Mountains. The geologic setting is one of basins, separated and surrounded by mountain ranges. The mountain ranges include the Owl Creek, Washakie, Absaroka, Wind River, Granite, and Rattlesnake. Basins include the Wind River, Great Divide and Green River. Igneous, metamorphic and sedimentary rocks of all geologic periods, except Silurian, are present and represent a time span from 3 billion years to the very recent—10,000 years before present. Sedimentary rocks within the Wind River Basin are approximately 30,000 feet thick at the deepest part. Paleozoic and Mesozoic foundations are exposed along the flanks of several anticlines throughout the resource area. Tertiary sediments cover most of the basin floors and frequently abut igneous rock exposures, as in the Granite Mountain area.

Parallel to and basinward from the mountain uplifts, are smaller anticlinal uplifts from which oil and gas are produced. Many significant anticlines are unconformably covered with several hundred feet of younger, flat-lying sediments. Numerous faults of all variations are found in the Lander Resource Area. Overthrusting along major faults throughout the resource area represents good prospects for future oil and gas exploration.

There are several geologic features throughout the Lander Resource Area that are of special interest because of their unusual characteristics: the scenic Red Canyon National Natural Landmark located a few miles southeast of Lander and the picturesque badlands near Dubois, Lysite and Castle Gardens. The Beaver Rim escarpment located along the south border of the Wind River Basin and Table Mountain just south of Lander are remnants of several thousand feet of sedimentary rocks that once filled the Wind River Basin. The Sweetwater Canyon, Devil's Gate and Wind River Canyon are outstanding examples of how rivers have cut through mountain ranges while the ranges were being formed and how basin erosion has occurred. There are outstanding glacial features in the Dubois area along the north flank of the Wind River range.


Paleontological resources have been found throughout the entire resource area, and the Wind River Formation contains vertebrate fossils of national significance. A wide variety of gem-quality minerals can be found throughout the Lander Resource Area.

### Oil and Gas

There are approximately 2.7 million acres of U.S. mineral estates within the Lander Resource Area. Nearly all of this acreage is available for oil and gas leasing, and approximately 70 percent, or 1.9 million acres, has been leased. About 5 percent (129,000 acres) of the total Lander Resource Area has been withdrawn or closed to leasing because of previous land-use decisions involving 81,000 acres and 48,000 acres of wilderness study areas.

Oil and gas are produced from 43 fields within the resource area (see map 3-1). These fields have accounted for over 130 million barrels of oil and



 Oil and Gas Field

Map 3-1  
Oil and Gas Fields  
Lander Resource Area

## Affected Environment

1.1 trillion cubic feet of natural gas since their discoveries. Approximately 3 percent of the oil and 13 percent of the gas produced in Wyoming have come from fields within the Lander Resource Area. Fremont County's market share of Wyoming's oil and natural gas production over the past 10 years has averaged 5 percent for oil and 16 percent for natural gas. In 1983, the county ranked eighth in oil production and second in natural gas production (DEPAD 1983). The oil and gas industry's share of property assessed for taxation in Fremont County for fiscal year 1984 was 73.42 percent, the eighth highest in the state (Petroleum Assoc. of Wyoming 1984). The leasing and development of federal minerals by the petroleum industry contribute very significantly to the employment and income of the population within the Lander Resource Area and the state.

The total number of applications for permit to drill (APDs) in the Lander Resource Area from 1979 through 1983 are shown on table 3-1. Also shown are the general areas where the permits have been authorized. For a 5-year average, the majority of the wells have been drilled in the Fuller Reservoir/Haybarn Hill fields, primarily as development wells. The next highest average is for the wildcat category. Drilling activity was highest in 1980 and decreased through 1983.

**TABLE 3-1**  
**NUMBER OF OIL AND GAS WELLS**  
**PERMITTED IN LRA AND**  
**PERCENTAGE BY GENERAL AREA**

Number of Wells Permitted General Area	Year					Average for 5 Years
	1979	1980	1981	1982	1983	
Lysite, Lost Cabin Area	35%	32%	20%	10%	13%	22%
Haybarn Hills, Fuller Reservoir	16%	18%	27%	57%	25%	28.6%
In Field Drilling Beaver Creek, Big Sand Draw, Crooks Gap/Happy Springs	16%	37%	10%	8%	13%	16.8%
S. Sand Draw				8%	13%	10.5%
Wildcats	33%	13%	43%	17%	36%	28.2%
<b>Total Number of Wells Permitted</b>	<b>43</b>	<b>73</b>	<b>56</b>	<b>61</b>	<b>55</b>	<b>57.6</b>

Under the present management of the federal mineral estate in the Lander Resource area, noncompetitive and competitive oil and gas leases have been issued with specific restrictions (stipulations) to protect various surface resources. The most common lease restrictions include seasonal drilling periods in crucial wildlife habitat areas and no occupancy on the surface of a lease (or portion of a lease) in specific areas because of steep slopes (more than 25 percent), historical trails, cultural resource sites, developed recreational sites, intermittent or live drainages and other water developments, certain elk crucial winter ranges, and sage grouse leks. Lease restrictions are based on past land-use planning decisions. These land-use decisions are listed in Alternative A. In most cases, a lease restriction can be modified by a lessee when specifically requested and approved by the District Manager of the BLM.

Geophysical exploration operations in the Lander Resource Area are authorized, using restrictions similar to those applied to oil and gas leasing. All seasonal closures are enforced and distance limitations are used to protect reservoirs, springs, water wells, riparian areas, and inhabited dwellings. An additional closure period during hunting season is used on Green Mountain for operations using helicopters and explosives. The number of notices of intent to conduct geophysical operations in the Lander Resource Area for the past 5 years are shown on Table 3-2. Operations in 1983 and 1984 had nearly doubled from any of the three previous years.

There are 40 named and unnamed known geologic structures (KGSs) within the resource area. Since the acreage within a KGS boundary

**TABLE 3-2**  
**NUMBER OF NOTICES**  
**OF INTENT TO CONDUCT**  
**GEOPHYSICAL OPERATIONS**  
**IN THE LANDER RESOURCE AREA**

	Year				
	1980	1981	1982	1983	1984
Number of Notices	29	31	39	74	63
<b>Total: 236</b>					

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defines the presumed productive limits of an oil and gas trap, most drilling and development activities will take place within this acreage. The concentration and number of surface disturbing activities within the KGS will vary, depending on whether the field produces oil, gas (and condensate), or both, and on the geologic formation depths from which the hydrocarbons are produced. Many of the gas fields were operated under Wyoming Oil and Gas Commission well spacing orders of 80 acres, 160 acres and 640 acres. The Beaver Creek, Big Sand Draw and Crooks Gap fields produce oil and gas but are excluded from any specific spacing orders (Commission Rule 302). The Madden and Frenchie Draw fields produce mostly gas from depths of approximately 10,000 and 20,000 feet, and the spacing of wells is 640 acres. Thus, the number of acres disturbed by operations in these fields may be greater or less than that of oil producing fields, but the total acreage committed to the KGS is far greater.

For an oil and gas producing field, operations that affect surface resources usually include the following: construction of an access road to a well site; construction of a drill pad and reserve pits; installation of the well-head, pump-jacks, flow line(s), production separator (oil-gas separation), heater treater (oil-water separation), stock tanks (oil storage), water disposal tanks or pits, dehydration unit (gas-water separation), and metering units. Each producing well may have all of these, or the production from several wells may go to one centralized location (battery) on lease. Other facilities within a field may include gas plants, storage yards, warehouses, and field offices. All of these facilities remain as a surface use for the life of the well(s) and the field.

In the Lander Resource Area, an average of 10 acres per well are disturbed. This acreage includes construction of roads, drill pads and flowlines. Wildcat and development wells were used to determine this acreage. Deeper gas wells (18,000 feet or more) within larger well spacing fields will require longer access roads and flowlines. Shallower oil or gas wells within 40-acre or smaller spacing fields will require shorter access roads and flowlines; but more of each. Constructed roads remain as long as wells produce. Surface disturbances created by installing buried flowlines and major pipelines are reclaimed within 3 to 5 years. If a well is plugged and abandoned, all disturbances are reclaimed to near original conditions within 3 to 5 years. Acreage utilized for producing wells generally decreases after drilling. The reserve pits used for drilling are backfilled and reclaimed and if water disposal pits are needed, the surface area required is less.

Oil is transported by truck or by pipeline from the fields. Roads used for transport are used as long as the fields produce and no reclamation is done. Oil and gas are shipped through major pipeline systems. The surface disturbances from pipeline construction are generally short term, because reclamation is completed in 3 to 5 years.

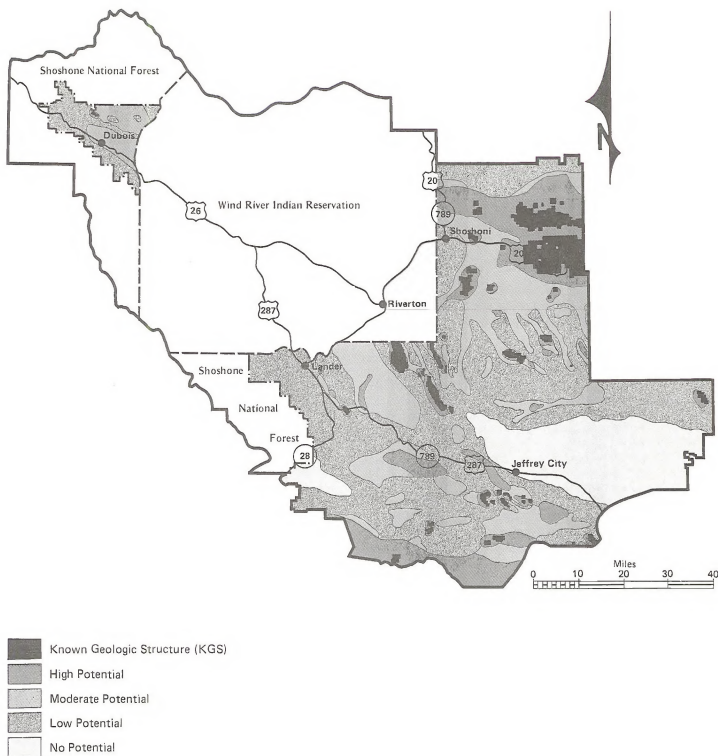
Geophysical operations within the resource area usually employ one of the following exploration methods: conventional shot-hole drilling and subsurface charges, vibroseis, surface charges, and portable operations that use portable drills and subsurface charges or simply surface charges. For all methods used, construction of trails and drainage crossing are not authorized unless absolutely necessary. Shot-holes are plugged according to the Wyoming Oil and Gas Commission rules—holes are filled with nonpermeable drilling fluids and sealed at the surface. Any surface disturbances from bulldozers or other equipment are reclaimed to as near original conditions as possible immediately after operations cease.

Rehabilitation of disturbed lands from oil and gas exploration and production are required. Reclamation generally includes recontouring of drill pads, production facility locations, all access roads; seeding to reestablish vegetation; and annual monitoring. BLM's rehabilitation guidelines and procedures are found in BLM Manual, sections 3045 and 3109.

An oil and gas potential rating system for the Lander Resource Area has been devised in order to better evaluate and address the effects that land-use planning are having, or will have in the future, on oil and gas exploration, leasing and development. It is difficult to accurately rate the public mineral estate in terms of the potential for the discovery of oil and gas and to predict the locations for future oil and gas drilling and production. However, the rating system will remain dynamic and as new information is gathered, necessary rating changes can be made. The ratings for the Lander Resource Area are shown on map 3-2, which includes known geologic structures (KGSs), high, moderate, low, and no-potential ranges.

However, the rating system will remain dynamic and as new information is gathered, necessary rating changes can be made. These ratings are defined as follows:

**Known Geologic Structures:** A KGS is technically the trap in which an accumulation of oil or gas has been discovered by drilling and determined to be productive, the limits of which include all acreage that is presumed productive.



Map 3-2  
Oil and Gas Potential Rating  
Lander Resource Area



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**High:** Geologic structures and formations highly favorable for the accumulation of oil and gas are known to exist.

**Moderate:** Many favorable nonproducing geologic structures and formations are present, but all potentially productive formations have not been drilled and tested.

**Low:** Geologic structures and formations are well defined and potentially productive formations have been drilled, tested and failed to produce oil and gas.

**No:** Geologic structures and formations are well defined and the potential for oil and gas accumulations does not exist.

These ratings will also be used to evaluate the effects that management alternatives could have on oil and gas resources.

Growth rates in drilling activity and success ratio have been determined by using the ratings of high, moderate and low potential. Based on data from Petroleum Information (1984), potential areas were evaluated to establish annual drilling activity and whether a well had produced or not. Figures 3-1, 3-2, and 3-3 show the historical levels of drilling activity and success rates by production potential area from 1880 to 1990. Growth rates of 1.5 percent for high-potential areas, -0.14 percent for moderate-potential areas, and -0.58 percent for low-potential areas are shown as the headlines in each figure. These growth rates were calculated using linear regression analyses techniques over a 34-year period. Historical success rates by potential oil and gas rating from 1950 to 1985 are shown in Figures 3-1 and 3-3.

In high-potential areas, the success rates averaged 65 percent, in moderate areas 10 percent, and in low areas 4 percent.

Table 3-3 shows the success rates for producing wells in high-, moderate- and low-potential areas over the past 34 years. The table also shows the total number of producing wells anticipated by 1990 and 1995. Based on an annual percent increase in drilling and average acreage disturbance of 10 acres per producing well, total acreage disturbed by 1990 and 1995 has been projected. These figures will be used to evaluate the effects of present land-use decisions and the effects of the alternatives on oil and gas exploration, leasing and development.

## Coal

There are five coal fields within the Lander Resource Area, none of which has active mines. The coal fields include Hudson, Beaver Creek, Big Sand Draw, Alkali Butte, and Powder River (Arminito). The Hudson field has accounted for 99.8 percent, or 3,973,402 tons, of the Wind River Basin's coal production (Glass and Roberts 1978). Coal beds are located in the Frontier, Cody, Lance, Fort Union, and Wind River formations, but the thicker and more important coal beds are found in the Upper Cretaceous Measaverde and Meeteetse formations (Glass 1978). Thicknesses for the numerous coal beds range from 3 to 30 feet, with an average of less than 10 feet. Wind River Basin coals compare favorably with coal produced in other basins in Wyoming in terms of moisture, ash and sulfur contents, and heating values. In the past 5 years, however, there has been little interest in exploring or leasing coal resources on public lands. Wind River Basin coal deposits are far from markets and good transportation systems, and the steep dips, deeper occurrence depths, and relatively thin nature of the beds have all contributed to the lack of interest in developing this coal (Glass 1978).

## Phosphates

Phosphatic rock occurs in the Permian Phosphoria Formation in three general locations within the Lander Resource Area. The largest and most well known occurrence area ranges from the North Fork Popo Agie River located west of Lander and then southeast along the northeast flank of the Wind River Range to the Sweetwater River. The other occurrence areas are the Crooks Mountain and the Covant Creek Anticline. These areas are shown on map 3-3. The Wind River Range deposits, better known as the Lander deposits, were first mapped in detail in 1924, and several other detailed mapping and sampling programs have been conducted by the Geological Survey, Bureau of Mines, and private industry since that time. Very little information is available about the Crooks Mountain and Covant Creek Anticline phosphate resources. The Lander deposits were first leased in 1962, and eight federal



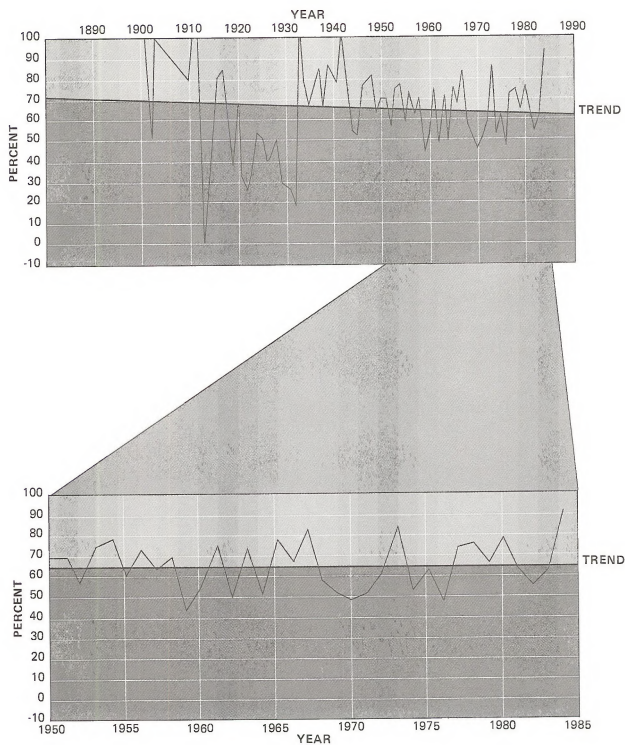


Figure 3-1  
High Production Potential Areas for Oil & Gas-  
Success Rates

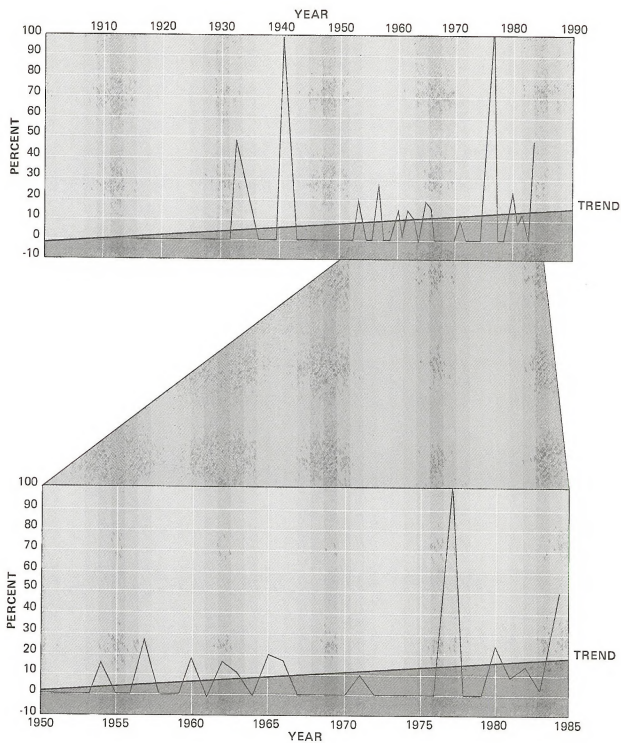


Figure 3-2  
Moderate Production Potential Areas for Oil & Gas-  
Success Rates

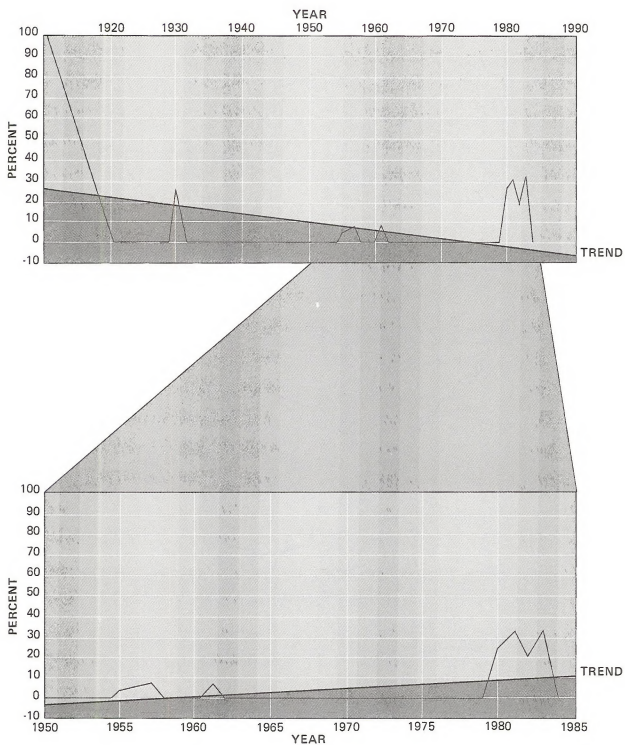


Figure 3-3  
Low Production Potential Areas for Oil & Gas-  
Success Rates



Map 3-3  
Leasable Minerals other than Oil and Gas  
Lander Resource Area

TABLE 3-3  
LANDER RESOURCE AREA OIL AND GAS WELL STATISTICS

Productive Potential Category	Total Wells Drilled Through (1984)	Percent of Wells That Produced	Average acres Disturbed per Producing Well	Average Annual Growth Rate 1950-1984 of Wells Drilled	Projected Total Number of Producing Wells	
					1990	1995
KGSs & High	1,904	65%	8	1.50%	1,410	1,442
Moderate	268	10%	8	-.14%	28	30
Low	283	4%	8	-.58%	13	13

leases, totalling 12,628 acres, were held by the Susquehanna Corporation until 1985. Susquehanna Corporation conducted exploration activities under prospecting permits before issuance of the leases. However, no mining operations occurred on the leases during their existence.

Phosphatic rock of the Phosphoria Formation is found within the upper Retort and lower Meade Peak Members in the Lander area (King 1947). Phosphate resource tonnages have been estimated for the area between Baldwin Creek, located about 5 miles southwest of Lander, and the Sweetwater River, 30 miles southeast of Lander. Chemical analyses from trenching and core samples range from 15 percent to 29.7 percent phosphorous peritoxide ( $P_2O_5$ ). For purposes of grade estimates of phosphate bearing rock, the term phosphate rock is restricted to rock containing at least 39.2 percent bone phosphate of lime (B.P.L.), which is equivalent to 18.0 percent  $P_2O_5$  by weight. Phosphate rock containing 18.0 to 24.0 percent  $P_2O_5$  is classified as low grade, 24.0 to 31 percent is medium grade, and 31.0 percent or greater is high grade (De Voto and Stevens, June 1979). The average grade of phosphate rock in the lower Meade Peak Member is 23.6 percent  $P_2O_5$  (low grade), but it ranges up to about 29 percent  $P_2O_5$  (medium grade). The rock in the upper phosphate zone, the Retort Member, is all low grade with an average of 17.1 percent  $P_2O_5$  (King 1947 and Coffuran 1967). Bed thicknesses range from less than 3 feet to 6 feet in the upper and lower zones throughout the Lander area. Two specific areas, the lands between the Little Popo Agie River and Cherry Creek and the Twin Creek area immediately east of Highway 28, have been identified as having the highest grade phosphate rock with the thickest beds. Extensive work by the Bureau of Mines in 1957 included studies of the feasibility of mining

and processing of the Twin Creek resources. To date, no mining has taken place on any of the phosphate occurrences.

Phosphate resource tonnages for the Lander area have been estimated. The estimates were based on an above drainage entry level and 100 feet below drainage entry level and used a minimum bed thickness of 3 feet. Total resources for both phosphatic rock members for the above drainage entry level (prospectively strippable resources) are 159,400,000 tons of 18 percent  $P_2O_5$ . Below the 100 feet entry level, total resources were 28,300,000 tons of 18 percent  $P_2O_5$ .

The Lander Resource Area has 1.4 percent of Wyoming's phosphate resources. Wyoming's phosphate resources are an eastern extension of the much larger Western Phosphate Field, which includes deposits in Idaho, Montana and Utah. Mining and processing of phosphate rock is active in southeastern Idaho and north-central Montana. Strip mining predominates underground mining. A phosphate mine is scheduled to start near Vernal, Utah, and phosphate ore will be slurried to Rock Springs, Wyoming, where Chevron has started construction of a phosphate processing plant. The Lander phosphate deposits are located about 9 miles from a rail line located at the abandoned iron mine near Atlantic City. This track ties into the Union Pacific Railroad just east of Rock Springs. A transportation system for shipping phosphate ores is available and the closest plant would be located at Rock Springs. Both of these facilities help to make the Lander phosphates more attractive for future leasing and development.

Although the Lander phosphate deposits are located near transportation facilities, several factors currently make the deposits uneconomical to develop. The deposits are thin and deep



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compared to other deposits in the Western Phosphate Field. In addition, problems such as high capital charges for new mines, the cost and time required to permit new mines, increasing severance taxes, underutilized phosphate rock capacity, large inventories, and weak demand for phosphate products create a poor economic climate (USDI, Bureau of Mines 1985). Therefore, new mines are unlikely to be developed in the thinner deposits, such as the Lander deposits, until economics improve.

### Uranium

Fremont County has accounted for over 26,000,000 tons of uranium ore since mining began in the 1950s. The county presently ranks second in the state for total uranium produced. Within the Lander Resource Area there are three major uranium mining districts, including Gas Hills, Crooks Gap (to include Green and Crooks mountains) and Bison Basin. Mining in the Gas Hills area has been predominantly by open-pit method. In the Crooks Gap area, both open-pit and underground mining occur. The Bison Basin operation is in situ. The Gas Hills district is the largest and has three operational mills. The Split Rock mill near Jeffrey City and Crooks Gap was the first uranium mill in Wyoming. There are several other known occurrences of uranium throughout the Lander Resource Area, some of which have produced small volumes of ore (map 3-4).

Uranium deposits in the Gas Hills area are located in the Eocene Wind River Formation. In the Crooks Gap area, ore is mined from the Eocene Battle Springs Formation. At the Bison Basin project, uranium oxides are leached from ore bearing sandstones in the Eocene Wasatch-Green River Formation. Another significant deposit, Copper Mountain, contains uranium in the Eocene Tepee Trails Formation and Precambrian granites and quartz monzonites (Hausel 1978).

Presently, only one mill is operating in the Lander Resource Area. Operations in all nearby areas have closed and stockpiles are being milled. In the past 4 years, exploration activities have also slowed dramatically. Some drilling is taking place on Green Mountain. Mining claimants are doing enough assessment work to hold their claim properties until the market improves. Reclamation in all areas of previous mining is continuing.

BLM's management responsibilities for uranium exploration and development are to enforce the Surface Management Regulations (43 CFR

subpart 3809) and to protect the public lands from unnecessary and undue degradation.

### Gold

Gold in the Lander Resource Area is located primarily in the historical South Pass district (South Pass Management Unit) on the southeastern end of the Wind River range and in the Tin Cup district of the Granite Mountains. Other occurrences of gold have been prospected in the old Bridger district in the Copper Mountains or Owl Creek range (see map 3-4).

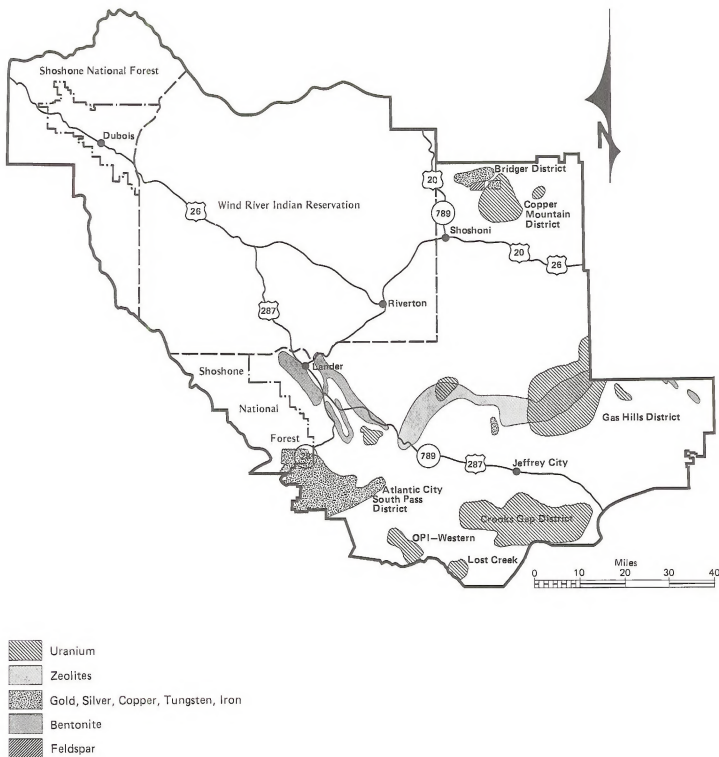
The first discovery of gold in Wyoming was made in 1845 along the Sweetwater River. Placer gold was later traced to the Carissa Lode located near South Pass City. This discovery led to the establishment of the historical South Pass, Atlantic City, Miner's Delight, and Lewiston districts, all of which were short lived. Gold production records for the districts are as diverse as the many inexperienced miners, mining and milling problems, and fraudulent schemes that characterized the old districts. Many of the old mines reportedly closed because of technical problems, not because of a lack of gold.

Mines in the Tin Cup district operated sporadically throughout the early to mid 1900s. Production figures are not available. Very little is known about mining activities in the Bridger district.

Gold occurs with copper in Precambrian rocks in the Bridger district. In the Tin Cup district, gold occurs in quartz veins associated with pegmatites in areas containing metamorphic schists. Gold in the South Pass area occurs in quartz veins or placer deposits derived from the veins (Bailey 1973).

The Lander Resource Area has received about 20 notices for the South Pass area in 4 years, which have been filed under the surface management regulations (43 CFR 3809). Under these notices, less than 20 acres of public lands have been disturbed by small operations. No mining operations in the Tin Cup and Bridger districts have been reviewed under the regulation requirements.

BLM's management responsibilities in the gold occurrence areas are to enforce the Surface Management Regulations (43 CFR subpart 3809), to protect the public lands from unnecessary and undue degradation, and to keep mineralized lands available for prospecting and location under the 1872 Mining Law.



Map 3-4  
Locatable Mineral Occurrences  
Lander Resource Area



### Zeolites

Zeolites in the Lander Resource Area occur mainly along Beaver Rim, with smaller deposits in the Granite Mountain area, Barras Springs area, the western portion of Crooks Mountain, along the Middle Fork of the Popo Agie River, and near Dubois. The most significant deposits are along Beaver Rim in the Beaver Creek Management Unit. They occur mainly in tuffs of the Eocene Wagon Bed Formation that were formed when acidic volcanic ash from the Yellowstone volcanic field was deposited and altered by carbonate-rich lake water (VanHouten 1964).

Zeolites have not been mined in the Lander Resource Area. The Beaver Rim deposits were extensively explored under sodium prospecting permits in 1973. Mining claims were located on the zeolites after they were declared a locatable mineral under the General Mining Law.

The marketability and use for natural zeolites are in an infant stage. However, the properties of zeolites make them potentially useful in water softening, in the manufacture of catalysts, in pollution control, and may one day be used to remove radioactive products from radioactive wastes (Hansel 1978).

BLM's management responsibilities in zeolite occurrence areas are the same as those for gold and uranium.

### Other Minerals

The Lander Resource Area is rich in additional mineral resources. Many of these minerals are known to occur, but for various economic reasons, they have never been mined to any significant extent. Such minerals include copper, tungsten, mica, beryl, bentonite, vermiculite, and precious stones such as rubies and sapphires. Other minerals have been exploited but have not received the recognition that uranium and gold have. These minerals include locatable minerals of nephrite jade, iron, silver, feldspar, and salable minerals of building stones, limestone, and sand and gravel. Jade has been found in nearly every part of the Lander Resource Area. Small mining operations in the Granite Mountain area account for a good portion of the jade mined in Fremont County annually. Sand, gravel, sandstone, limestone, and shale are mined from public lands for uses in highway and road construction. Small volumes of building stone, more commonly referred to as moss rock, are sold by the Lander Resource Area each year.

Salable minerals are managed by the BLM under the 43 CFR subpart 3600 regulations and are disposed of under a contract or free-use permit.

## SOILS, WATER AND AIR QUALITY

The Lander Resource Area consists of 2.5 million acres of public lands in west-central Wyoming. The area includes most of Fremont County and includes portions of Hot Springs, Natrona, Sweetwater, and Carbon counties.

The Wind River Mountains to the west of the Lander Resource Area create an orographic effect, which blocks the moist air currents from the Pacific Coast. Most of this moisture occurs on the west slope of the mountains. This situation has resulted in the evolution of the semiarid rangelands that cover most of the area.

The following sections describe the physiography, relief soil erosion, and drainage of the Lander Resource Area.

### Physiography, Relief and Drainage

The Lander Resource Area is bounded on the west by the Wind River Mountains. The Absaroka Mountains meet the Wind River Mountains above Dubois. The Shoshone Mountains, northeast of Dubois, lie between the Absaroka range on the north and the Owl Creek Mountains on the south. Extending across the northern boundary of the Wind River Indian Reservation are the Shoshone and Owl Creek mountains. The Owl Creeks end in the east at Wind River Canyon. Continuing east from Wind River Canyon are the Bridger Mountains. The Bighorn Mountains occur in the very northeastern corner of the area. The Rattlesnake Mountains are a small range in western Natrona County. The Green Mountains are located south of Jeffrey City and separate the Great Divide Basin from the Granite Mountain Uplift. Along the Sweetwater River are the Granite Mountains-Sweetwater Rocks (see map 3-5).

The majority of the area is included in the Wyoming Basin, with very limited acreage in the Great Divide Basin. There are several subdivisions of the Wyoming Basin: the Shoshoni Basin, the Wind River Basin, and the Granite Mountain Uplift. The Shoshoni Basin is located between the Rattlesnake and Wind River mountains on the south and the Owl Creek and Bridger Mountains



Map 3-5  
 Physiography of  
 Lander Resource Area

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on the north and the Oil Mountain anticline on the east. The Wind River Basin covers the western part of the Shoshoni Basin (Fenneman 1931). Both the Shoshoni and Wind River basins are covered with Tertiary material of the Wind River Formation. Beaver Rim is the northern boundary of the Granite Mountain Uplift. Cyclone Rim and the Green Mountains are the southern boundary, which separate the Wyoming Basin from the Great Divide Basin to the south. The White River Formation provides most of the parent material for the soils of the Granite Mountain Uplift (Sweetwater Arch). The Wasatch Formation covers that part of the Great Divide Basin found in the Lander Resource Area.

The Wind River Mountains have a broadly exposed granitic core characterized by narrow crests between deep, glaciated gorges. The area is not typical because the foothills occur in the basin, away from the mountain front. This relief is the result of geologic processes that began with the formation of the mountains. After the mountains were formed, Tertiary sediments were deposited in the basin. This process was followed by a period of erosion. Next, valley fill of stratified sand, gravel, cobbles, and boulders was deposited. The erosion cycles continued and most of the valley was carried away. (SCS - Soil Survey - Riverton area).

The rough, rugged country of the Absaroka Mountains is essentially a broad elevated plateau comprised of layers of magma that were laid down in the Tertiary period. Erosion of this plateau has created the Absarokas. Volcanic conglomerate and breccias are the geologic materials that make up these mountains.

The Wiggins Formation comprises most of the Shoshone Mountains. This is gray to brown coarsely bedded volcanic conglomerate interbedded with blocky tuffaceous claystone.

The Owl Creek and Bridger mountains have a granitic core. Limestone overlays the granite in parts of the Owl Creeks and the western Bridger Mountains. The mountain front has many faults and the rock strata are steeply dipping.

The southwest flank of the Big Horn Mountains is located in the northeastern corner of the resource area. The Bridger Creek syncline intervenes between the Bridger Mountains and the Big Horn Mountains. Like the Bridger Mountains, the Big Horns are an anticlinal range, but they are greatly modified by faulting. Unlike the Bridgers, the Big Horns in the area have Mesozoic rocks exposed on their southern flanks. These Mesozoic rocks are the ocher-colored siltstone of the Dinwoody Formation and cherty dolomite and dark colored, phosphatic siltstone and shale,

which make up the Phosphoria Formation. Precambrian granite, gneiss, and schist, which are all cut by dikes of pegmatite, form the core of the Big Horns.

The Rattlesnake Mountains, which run from the northwest to southeast, are located in western Natrona County. The Rattlesnakes were carved by erosion from the Rattlesnake anticline. They are made of volcanic dikes, laccoliths, sills, plugs, and multiple vents. There is an exposed core of Precambrian schist. The igneous rocks that make up most of the Rattlesnakes are flanked by strata of Madison limestone and Flathead sandstone.

Some of the foothills of the Green Mountains are made up of members of the White River Formation. The rugged Owl Hills on the northeast corner of Green Mountain are made of Precambrian granitic rock. Crooks Gap Conglomerate is the chief component of the material that covers the Green Mountains, with some minor amounts of the Wagon Bed and Wasatch Formation materials occurring mostly in the park areas on top of Green Mountain.

The Sweetwater Rocks, or Granite Mountains, are the remnants of an ancient mountain range that were buried by alluvium after subsiding. This area was uplifted and erosion has exposed the Precambrian granitic rock that makes up this range.

The Lander Resource Area can be divided into two major drainage systems: the Missouri River Basin and the Great Divide Basin. The Missouri River Basin can be further subdivided into the Wind River Drainage, the Sweetwater River Drainage, and a small area in Natrona County that drains into the North Platte River directly. The Great Divide Basin is a hydrologically closed basin.

## Soil Erosion

Soil erosion is the wearing away of the surface of the earth, mainly by wind and water. The Dubois Badlands and Sweetwater Canyon are two striking examples of the results of natural erosion in the Lander Resource Area.

Erosion is both destructive and constructive. The redeposited eroded materials are the basic parent material of young soils on the floodplains. This natural erosion is important to soil development on the floodplains.

There are two general classes of erosion: natural and accelerated erosion. Natural erosion is usually a gradual process. Volcanism,

## Affected Environment

geologic uplift, climatic changes, or fire may cause more rapid rates of natural erosion. However, for the most part, natural erosion is the normal soil loss that occurs in an undisturbed landscape. Accelerated erosion refers to erosion that results from disturbance to a natural landscape by man. It can be caused by burning, forest cutting, excessive grazing, road construction, and other land uses that eliminate or decrease the vegetative cover. With this loss of cover, exposed soil is susceptible to increased erosion if not managed properly.

Water erosion occurs by raindrop impact, runoff, frost heaving, and gravitational creep of very wet soils. Three types of water erosion are sheet, rill and gully erosion. These are differentiated from one another by the relative depth and stability of the channels cut by runoff. The most widespread form of erosion, sheet erosion is the most inconspicuous. Sheet erosion is the generally uniform removal of soil without the development of apparent water channels. Rill erosion removes soil by small, conspicuous channels cut by runoff. Rill erosion channels can be up to 6 inches in depth. Gully erosion is the most visible form of water erosion, but does less damage than sheet and rill erosion to the soil resource. Channels range upward from 6 inches deep to canyon size.

Gully erosion patterns generally occur in two basic forms: V-shaped and U shaped. V-shaped gullies form in soils made up of coherent materials throughout and U-shaped gullies are commonly developed in soils made up of materials that have low coherence. Undercutting by water erosion of soft strata at the head of the gully causes its advance upstream; this is called head-cutting. In this type of gullying, columns that form along the sides of the channel are common. They eventually crumble into the bottom and are carried away (see figure 3-4).

Wind erosion is also an important process occurring in the area. Anything that causes a loss of vegetative cover or reduces soil surface stability will accelerate the rate of erosion by wind. Generally, soil blowing is greater on gentle and level slopes than on steep slopes. Blowouts, depressions caused by wind erosion, are found in the sandier areas of the Lander Resource Area. Areas susceptible to severe wind erosion occur east of Ocala to the county line, south of Green Mountain, east of Jeffrey City, and on some fine textured soils in the Great Divide Basin.

Erosion rates in the Sweetwater drainage and the Great Divide Basin are moderate to slight. In the rest of the Lander Resource Area, erosion rates are slight to moderate (see table 3-4, USDA 1984).

**TABLE 3-4**  
**SOIL EROSION CLASSES**

Magnitude of Impact	Amount of Impact
None to slight	Less than 1 ton/acre/year
Moderate	1 to 2 tons/acre/year
Severe to very severe	More than 2 tons/acre/year

## Watershed

There are two principal river systems that occur extensively in the Lander Resource Area: Sweetwater River and Wind River. Both the eastward flowing Sweetwater River and the northward flowing Wind River are members of the Missouri River Basin drainage system. A minor area in Natrona County contributes directly to the North Platte River, which the Sweetwater River joins at Pathfinder Reservoir. Southern parts of the area contribute drainage to the Great Divide Basin, a hydrologically closed basin (see map 3-6).

Watersheds in the Lander Resource Area consist almost entirely of rangelands, with limited acreages of forest land. A water deficit exists on the rangelands in most of the RMP area. This implies that there are few perennial streams and runoff is largely intermittent. Most of the perennial streams originate in the mountains, which are water surplus areas where snowmelt contributes to the majority of the runoff. As a result of the water deficit that exists on the semi-arid rangelands of the area, the amount of water from BLM-administered lands to the major streams is not great. Most of the precipitation is lost through evapotranspiration and sublimation instead of creating runoff or recharging groundwater aquifers (Leopold 1960).

BLM's watershed program is concerned with the protection, enhancement, and rehabilitation of soil, air and water resources. Water availability, quantity and quality are of major importance to everything from local communities, agriculture and industry to recreation and wildlife. The major use of water in the area is for livestock and wildlife (BLM 1979).

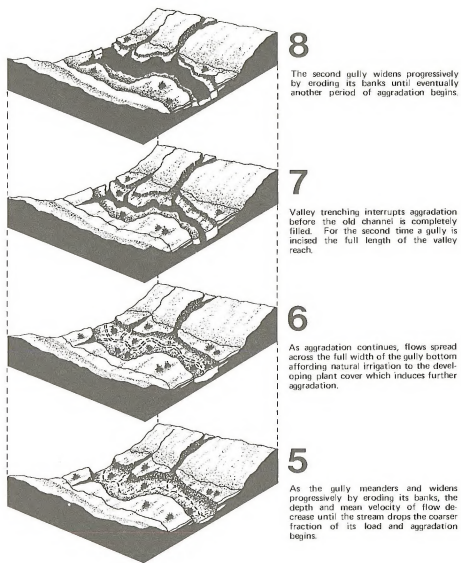
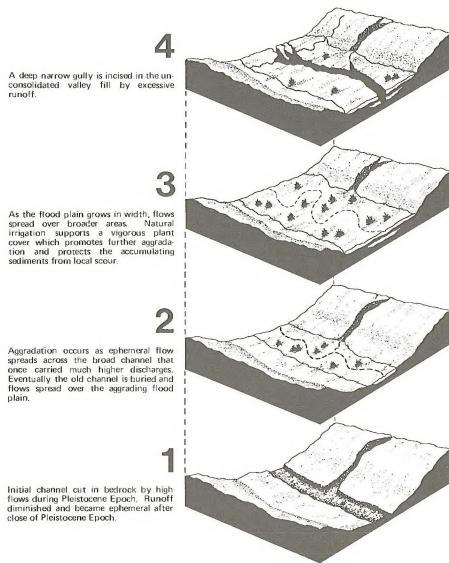
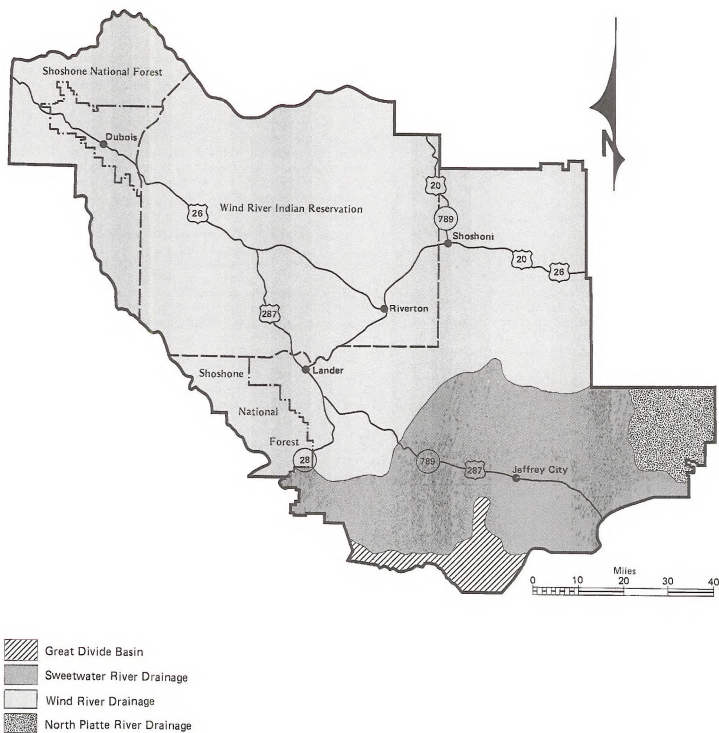


Figure 3-4  
Diagrammatic Sketch Showing the  
Development of Cut & Fill Terraces  
in a Hypothetical Valley Reach





Map 3-6  
Principal Drainages  
Lander Resource Area

### Water Quantity and Quality

#### Water Quantity

Natural waters that provide dependable, year-round watering for livestock and wildlife are poorly distributed. As a result, hundreds of livestock ponds and other water developments have been constructed in the Lander Resource Area. These developments provide a very significant percentage of the total water available for livestock and wildlife. Evaporation losses from these developments are large and far exceed the amount utilized by livestock and wildlife. Natural springs are important sources of water in the area. Nearly all water sources are open to and used by livestock and wildlife. A more detailed account of water discharge occurring at specific locations is available from the University of Wyoming Water Research Center, Water Resource Data Systems, Laramie, Wyoming. The data were generally collected by USGS and can also be obtained from its offices in Cheyenne, Casper, and Riverton.

#### Water Quality

The perennial streams in the resource area are generally of good quality. Amounts of suspended sediment and dissolved solids are greatest during years of above average precipitation and subsequent large runoffs; however, concentrations of dissolved solids are highest during years of low runoff and also during periods of low flow. Wind River and Sweetwater River nutrient levels are generally low. In general, the surface waters and groundwater are suitable for watering livestock and wildlife. However, there are a few springs, wells and ponds with concentrations of total dissolved solids (TDS) in excess of 3,000 milligrams/liter (mg/l). TDS concentrations above 3,000 mg/l are potentially hazardous to wildlife and livestock (Office of Water Planning and Standards 1975). Major perennial streams in the resource area are usually within the recommended federal drinking water standard of 500 mg/l of total dissolved solids (CFR 40, Parts 141 and 143. Wyoming DEQ 1979). Many ephemeral and intermittent streams, such as West Alkali and East Alkali creeks are capable of producing high TDS concentrations at times. East Alkali creek had a TDS concentration of 4,187 mg/l during May 1977, and West Alkali creek had a TDS concentration of 1,468 during the same month (BLM 1982).

Ground water usually contains more dissolved mineral matter than surface water because ground water remains in contact with rocks and soils for

longer periods. River water, because of contribution from many different sources—springs, snowmelt and other precipitation—varies more in chemical character than ground water (Leopold 1960).

Sediment content and fecal coliform bacteria are two other major surface water quality factors of special concern in rangeland watersheds. Fecal coliform contamination in various waters is caused primarily by livestock and wildlife. Levels of fecal coliform bacteria are used as indicators of the presence of infectious agents.

Suspended sediment, because of soil erosion, is the most serious surface water pollutant in the resource area. Sediment yield is highest during the spring and summer when runoff from snowmelt and rains occur. This is reflected by slight to moderate erosion rates, with slightly higher rates occurring in the Great Divide Basin and Sweetwater River drainage (SCS 1984).

Selected water quality measurements for the two major rivers in the area are given in tables 3-5, 3-6 and 3-7. A more detailed account of water quality at specific locations can be obtained from the University of Wyoming Water Research Center, Water Resources Data Systems, Laramie, Wyoming. The data were generally collected by USGS and can also be obtained from their offices in Cheyenne, Casper and Riverton.

### Water Rights

BLM water policy and guidelines for development and use of water on public lands is set forth in USDI-BLM-WY-SO Instruction Memorandum No. WY-80-9 (7250 (9321) *Water Policy*, Oct. 10, 1979.

BLM had been instructed to join with the state of Wyoming in a general adjudication of all rights to use water in the Big Horn River System.

The Joint Motion of the state of Wyoming and the United States brought before the District Court of the Fifth Judicial District, state of Wyoming was, "an effort to settle disputes concerning the existence and extent of the non-Indian claims of the United States to water in this adjudication, those parties had by stipulation agreed to the terms of the Decree affecting those rights and moved for an appeal of that Decree" (Big Horn Adjudication 1983).

In the Sweetwater River drainage, water development projects would be considered but would be subject to existing laws and restrictions such as the Wyoming-Nebraska North Platte River Compact. This decree limits irrigation in Wyoming



## Affected Environment

TABLE 3-5  
WATER QUALITY OF THE WIND RIVER  
ABOVE BOYSEN RESERVOIR NEAR SHOSHONI, WY

	Hardness (Ca <sub>2</sub> Mg)	Dissolved Solids (Sum of Constituents)	Dissolved Chloride (Cl)	Dissolved Sulfate (SO <sub>4</sub> )	Total Carbonate (CO <sub>3</sub> )	Phosphorus (P)	Dissolved Nitrite Plus Nitrate (N)	Dissolved Oxygen	Fecal Coliform <sup>2</sup>
Water Year October 1974 to September 1975									
Discharge (Weighted Average) <sup>1</sup>	241.3	416.4	3.4	164.9	0.6	—	0.2	9.9	351.9
Range of Concentrations	76-310	115-528	0.1-0.5	29-230	0-8	—	0.03-0.71	8.0-12.1	39-811
Water Year October 1976 to September 1977									
Discharge (Weighted Average) <sup>1</sup>	267.3	476.5	7.9	190.9	—	0.07	0.19	9.6	536.5
Range of Concentrations	160-330	293-678	5-16	120-300	—	0.02-0.21	0.01-0.44	7.3-11.8	54-2,500

<sup>1</sup> All readings in mg/l.

<sup>2</sup> Coliform per 100 ml.

on the main stem of the North Platte River above Guernsey Reservoir and on the North Platte tributaries above Pathfinder Dam to 168,000 acres of land. The decree severely limits the possibility of any irrigation storage projects on the Sweetwater, because approximately 157,000 acres are being irrigated within the area and a storage capacity that will irrigate land in excess of 18,000 acre-feet has been constructed, thus exceeding the 168,000-acre limitation.

### Air Quality

Air quality in the Lander Resource Area is generally very good, with ambient concentrations of pollutants being low and background visibility at about 105 miles. The Lander Resource Area has been designated as Class II under the Wyoming Department of Environmental Quality's approved State Implementation Plan. Class II areas are those that may be industrialized with release of certain pollutants up to a specified level of concentration.

There are no major sources of air pollution in the Lander Resource Area. Major emission sources in Wyoming must not produce concentrations of air pollutants beyond either the Class II increments (or the Class I increments in Class I areas) and/or the Wyoming Ambient Air Quality Standards. No areas of violation (nonattainment) exist within the Lander Resource Area. An atmospheric deposition monitoring station recently began operations southwest of Lander in Sinks Canyon. This site is part of the National Atmospheric Deposition Program/National Trends Network.

In the Lander Resource Area, natural gas wells that have high concentrations of hydrogen sulfide (H<sub>2</sub>S) have been encountered. Hydrogen sulfide rich natural gas is known as sour gas. Natural gas from these wells, sour with H<sub>2</sub>S, must be cleaned, or sweetened, of this substance at specialized plants. These sweetening plants, sour natural gas pipelines, and the wells themselves can pose a danger to the public, livestock and wildlife through accidental H<sub>2</sub>S release.

## Affected Environment

TABLE 3-6  
WATER QUALITY OF THE WIND RIVER  
BELOW BOYSEN RESERVOIR NEAR SHOSHONI, WY

	Hardness (Ca <sub>2</sub> Mg)	Dissolved Solids (Sum of Constituents)	Dissolved Chloride (Cl <sup>-</sup> )	Dissolved Sulfate (SO <sub>4</sub> )	Carbonate CO <sub>3</sub>	Total Phosphorus (P)	Dissolved Nitrate (N)	Dissolved Oxygen	Fecal Coliform <sup>2</sup>
<b>Water Year October 1974 to September 1975</b>									
Discharge (Weighted Average)	206.6	401.6	8.8	175	0.25	0.02	0.12	10	4
Range of Concentrations	150-270	286-509	5.3-13.0	130-240	0-3	0-0.05	10.05-0.32	7.2-13.8	4
<b>Water Year October 1976 to September 1977</b>									
Discharge (Weighted Average)	221.6	464.6	8.1	193.3	—	0.02	0.16	10.9	4.9
Range of Concentrations	180-260	367-567	1.9-14.0	160-270	—	0.01-0.03	0.01-0.03	8.2-14.6	4-44

Source: Water Resources Data for Wyo. Water Year 1976, Vol. 1, Missouri River Basin, USGS Water Data Report.

<sup>1</sup> All readings in mg/l.

<sup>2</sup> Coliform per 100 ml.

## FISH AND WILDLIFE

### Fish

#### Introduction

Rainbow, brook, brown, and cutthroat trout are found throughout the resource area. No other gamefish or important fish species would be affected. Both stream and reservoir habitats would be altered under some of the management actions considered.

Whiskey Mountain is the only resource management unit where fisheries would not be affected. The Beaver Creek, Red Canyon, Green Mountain, South Pass, and Lander Slope management units have been previously analyzed under various livestock grazing management alternatives (Green Mountain Grazing EIS 1982). Grazing management decisions for this area

(Green Mountain Rangeland Program Summary 1983) are expected to improve the condition and production of some of the trout habitat in this area in the future. Since grazing management changes are not being considered, no further discussions of these resource management units in relation to livestock grazing will be included in the fisheries section.

One of the better fisheries in the Lander Resource Area, Sweetwater Canyon, has been considered in the Wilderness EIS supplement and, therefore, will not be addressed here.

The waters of the resource area have not been subdivided into various standard habitat types. Taken as a whole, these waters are the least plentiful of all habitats. The presence of open water is partly responsible for the high diversity of wildlife species in adjacent riparian habitats, and many fish and wildlife species are totally dependent on open water (e.g., trout, waterfowl, aquatic furbearers). Aquatic habitats have very high priority and are very sensitive to human disturbance.

## Affected Environment

TABLE 3-7  
WATER QUALITY OF THE SWEETWATER  
RIVER AT THE DUMBELL RANCH<sup>1</sup>

	Hardness (Ca <sub>2</sub> Mg)	Total Dissolved Solids	Chlorine	Sulfate	Carbonates	Phosphorus	Nitrates	Dissolved Oxygen	Fecal Coliform <sup>2</sup>	Suspended Sediments
<b>Water Year 1974 to 1975</b>										
Discharge (Weighted Average)	108	192	11.5	34.2	126.8	.034	.065	8.5	51.4	48.5
Range of Concentrations	75-200	128-383	6.5-28	19-73	84	0-.08	0-.07	6.4-11.3	22-88	10-92
<b>Water Year 1976-1977</b>										
Discharge (Weighted Average)	146	283.2	18.5	625	170	.024	.125	10.0	348.3	27.5
Range of Concentrations	130-190	227-380	8.8-44	45-100	130-210	0-.07	0-.34	8.8-10.7	2.2-618	4-82

Source: Geological Survey, 1976, and Geological Survey, 1978.

Note: Total water discharge for April-September during water years 1974-75 was 95,620 acre-feet. Total water discharge for April-September during water year 1976-77 was 23,756 acre-feet. There are no discharge records for October-March.

<sup>1</sup> The Sweetwater River at the Dumbell Ranch is the best representative sample area for water quality, because data from the Sweetwater Station, Wyoming, was not available.

<sup>2</sup> Fecal coliform is measured by counting the number of coliform colonies in 100 milliliters of water.

### Streams

Forty-nine trout streams are included in the affected environment (see table 3-8). Streams without a viable trout population, but with the potential to support trout, have not been discussed.

The majority of the stream fisheries affected are small, low-production waters containing brook trout, which are either in a plains or a foothills setting. The most important water likely to be affected is the Wind River in the Dubois Management Unit.

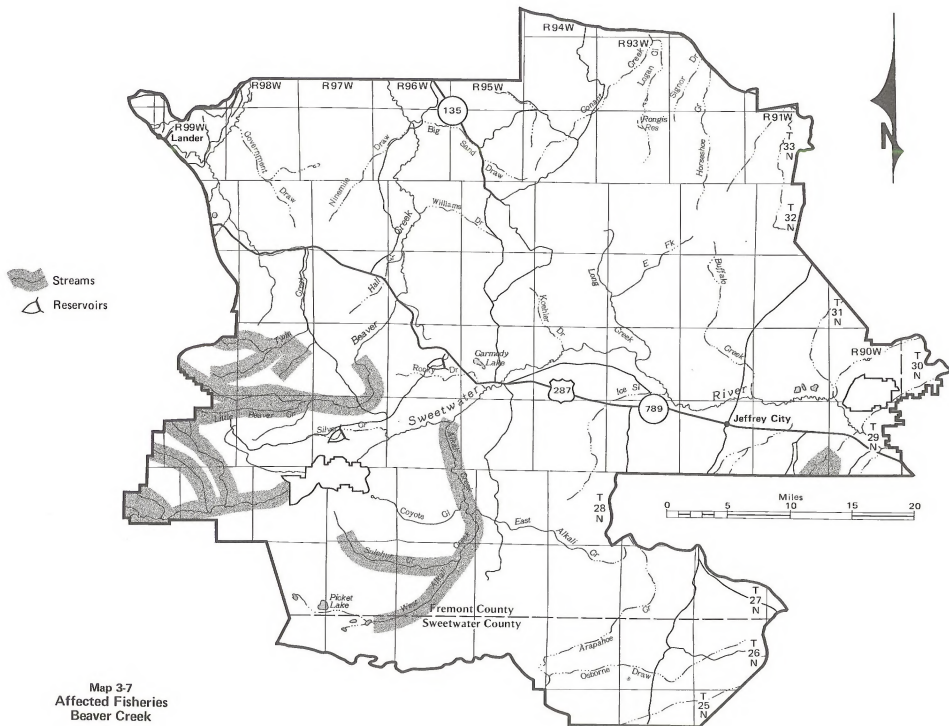
Trout streams affected cover the entire range from steep, rocky mountain streams to low-gradient plains streams that flow through meadows and sagebrush. The productivity of trout streams is highly dependent on the condition of adjacent riparian habitat types, and poor conditions are in evidence along many of the affected streams. A highly significant loss of woody riparian vegetation has occurred over the last 50 years in many areas. A combination of

grazing practices, total fire suppression, mortality because of herbicide spraying on adjacent vegetation, and lack of beaver management is probably responsible for the majority of loss of woody streamside vegetation. Sagebrush and conifer have become the dominant species along many streams. This has in turn led to conditions detrimental to trout stream habitat. These conditions are lower summer flows, lack of beaver and debris dams, lack of trout cover, increased temperatures, sedimentation of stream bottoms, etc.

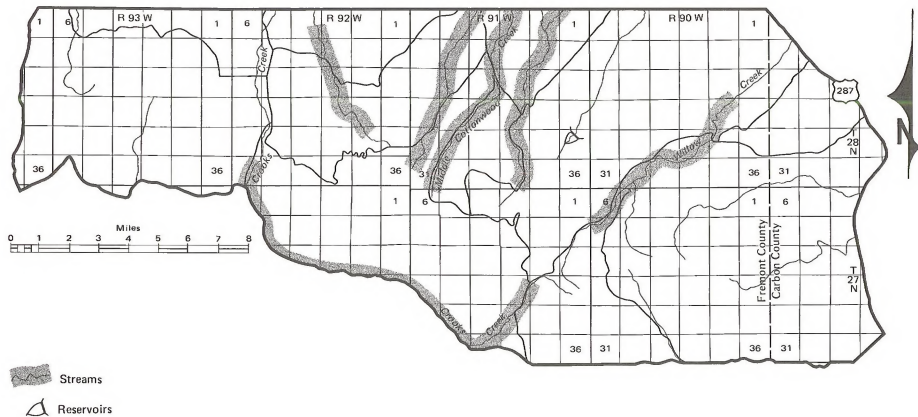
### Reservoirs

Two reservoirs in the Beaver Creek Management Unit along the Sweetwater River could be affected: Antelope Springs and Silver Creek (see map 3-7). These small livestock-watering reservoirs are highly productive rainbow trout fisheries that are popular with local fishermen. A small reservoir on Green Mountain, Spring Creek, could be affected (see map 3-8).









Map 3-8  
Affected Fisheries  
Green Mountain



# Affected Environment

TABLE 3-8  
AFFECTED FISHERIES IN THE LANDER RESOURCE AREA

Fishery	Resource Management Unit	Wyoming <sup>1</sup> Game and Fish Classification	Gamefish Present <sup>2</sup>
<b>Sweetwater River Drainage</b>			
Sweetwater River	Beaver Creek	3	BR,RB
Dry Creek <sup>3</sup>	Gas Hills	4	BK
Sage Hen Creek	Gas Hills	4	BK
East Sage Hen Creek	Gas Hills	4	BK
Middle Sage Hen Creek	Gas Hills	4	BK
West Sage Hen Creek	Gas Hills	4	BK
Willow Creek I	Green Mountain	4	BK
Cottonwood Creek	Green Mountain	4	BK
East Cottonwood Creek	Green Mountain	3	BK
Middle Cottonwood Creek	Green Mountain	4	BK
West Cottonwood Creek	Green Mountain	4	BK
Crooks Creek	Green Mountain	4	BK
Sheep Creek	Green Mountain	4	BK
Alkali Creek	Beaver Creek	4	BK
Sulphur Creek	Beaver Creek	4	BK
West Alkali Creek	Beaver Creek	4	BK
Pine Creek	Beaver Creek	4	BK
Slaughterhouse Gulch	Beaver Creek	4	BK
Willow Creek III	South Pass	3	BK,CT
Big Hermit Gulch	South Pass	3	RB
Little Hermit Gulch	South Pass	3	RB
Deep Gulch	South Pass	4	BK
Spring Gulch	South Pass	4	BK
Rock Creek	South Pass/ Beaver Creek	3	BK,BR,RB
Smith Gulch	South Pass	4	BK
Big Atlantic Gulch	South Pass	3	BK,CT
L. Beaver Creek	South Pass	4	BK,CT
Slate Creek	South Pass	4	BK
<b>Wind River Drainage</b>			
Wind River	Dubois	2	RB,BR,BK,WF
Popo Agie River			
Beaver Creek	Beaver Creek	3	BK,BR,RB
Little Beaver Creek	Beaver Creek	4	BK
Horace Gulch	South Pass	4	CT
Irish Gulch	South Pass	4	CT
Little Popo Agie River	Red Canyon	3	BK,BR,RB,WF
Twin Creek	Beaver Creek	4	BK
Tweed Creek	Beaver Creek	4	BK
Stormbaugh Creek	Beaver Creek	4	BK
Red Canyon Creek	Red Canyon	4	BK,BR
Cherry Creek	Red Canyon	3	BK,BR,RB
Deep Creek	Red Canyon	4	BK
Barrett Creek	Red Canyon	4	BK
Middle Popo Agie River			
Crooked Creek	Lander Slope	4	BK
Sawmill Creek	Lander Slope	3	BK

## Affected Environment

TABLE 3-8 (Continued)  
AFFECTED FISHERIES IN THE LANDER RESOURCE AREA

Fishery	Resource Management Unit	Wyoming <sup>1</sup> Game and Fish Classification	Gamefish Present <sup>2</sup>
North Fork Popo Agie	Lander Slope	4	BK
Mexican Creek	Dubois	3	BK,BR,CT, RB,WF
East Fork Wind River			
Wiggins Fork	East Fork/Dubois	3	WF,RR,BR,CT
Bear Creek	East Fork/Dubois	3	WF,RR,BR,CT
Horse Creek	Dubois	4	BK,BR,RR,WF
Badwater Creek			
Dry Creek			
West Fork Dry Creek	Gas Hills	4	BK

<sup>1</sup> Wyoming Game and Fish Department Stream Fishery Classes:

- Class 1 - Blue-Premium trout waters-fisheries of national importance
- Class 2 - Red-Very good trout waters-fisheries of statewide importance
- Class 3 - Yellow-Important trout waters-fisheries of regional importance
- Class 4 - Gray-Low production waters-fisheries frequently of local importance but generally incapable of sustaining substantial fishing pressure
- Class 5 - Not colored. Very low production waters-often incapable of sustaining a fishery

<sup>2</sup> Abbreviations:

- BK=eastern brook trout
- BR=brown trout
- RB=rainbow trout
- CT=cutthroat trout
- WF=mountain whitefish

<sup>3</sup> Indentation denotes tributary status

## Summary

The affected fisheries have been divided into three groups: those falling within the old Green Mountain Grazing EIS area (maps 3-7 to 3-11), those in the Gas Hills Management Unit (map 3-12), and those in the Dubois Vicinity (maps 3-13 to 3-15).

The Gas Hills Management Unit contains few fisheries and the stream fisheries affected in this unit are small, little-known brook trout streams.

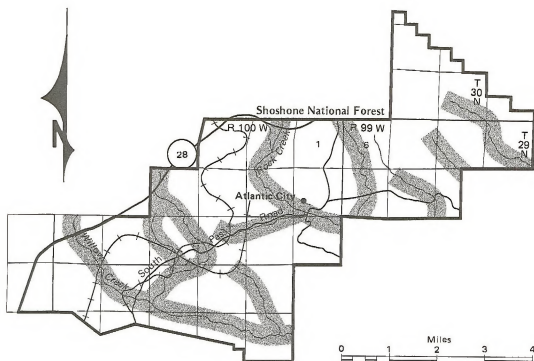
The Dubois vicinity has large, important streams that contain several species of gamefish.

The remaining area contains a diverse group of affected fisheries. The South Pass Management Unit contains the largest number of streams and receives the most fisherman use in the resource area (see map 3-9).

## Wildlife

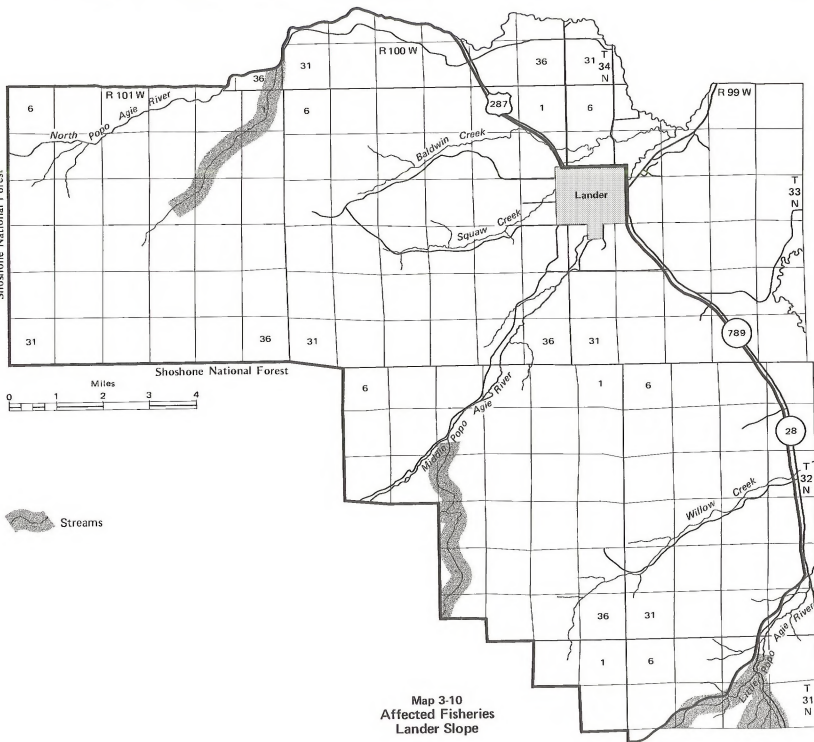
### Introduction

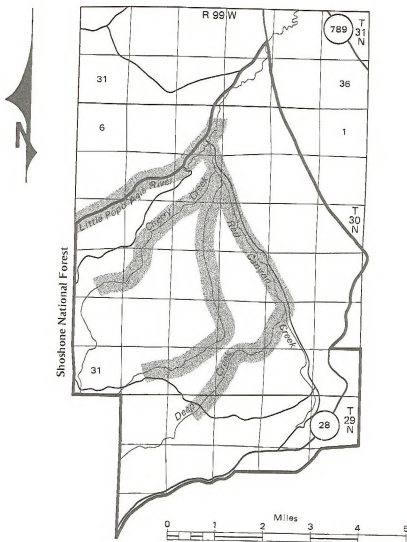
Many wildlife populations and habitats are located throughout the Lander Resource Area. Analysis of various management alternatives for each of the major resource issues indicates that some wildlife populations and habitats would be significantly affected by one or more of the management alternatives. Wildlife resources that would be significantly affected are described under one of the following, categories: wildlife habitat, big game, game birds, raptors, waterfowl and shorebirds, threatened and endangered species, and important furbearers.



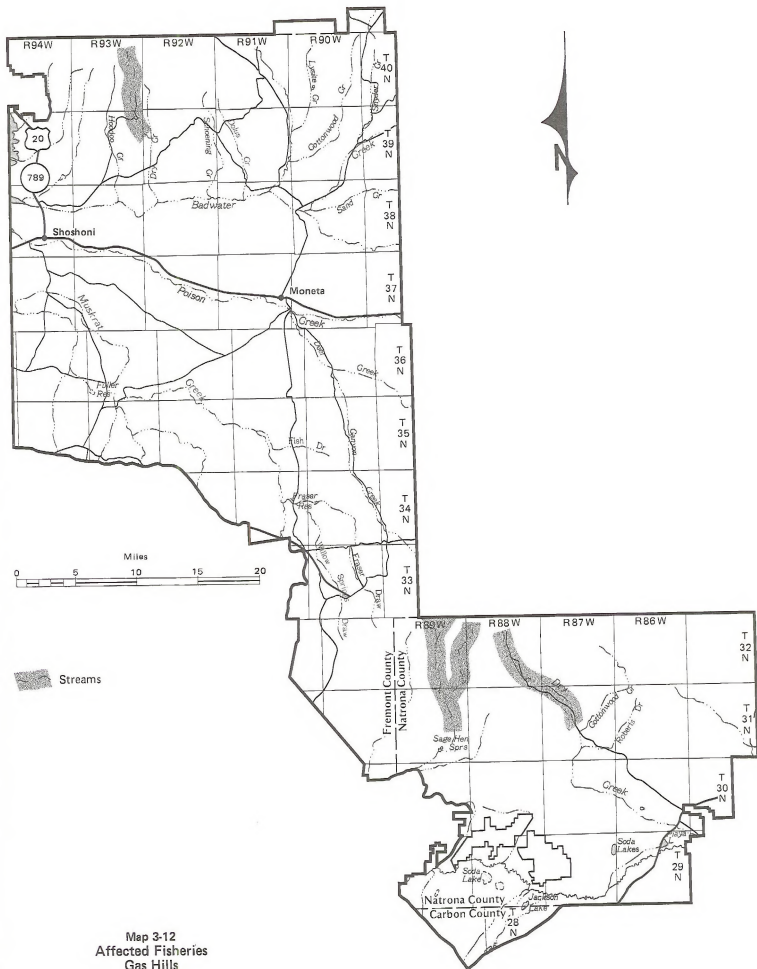
Map 3-9  
Affected Fisheries  
South Pass

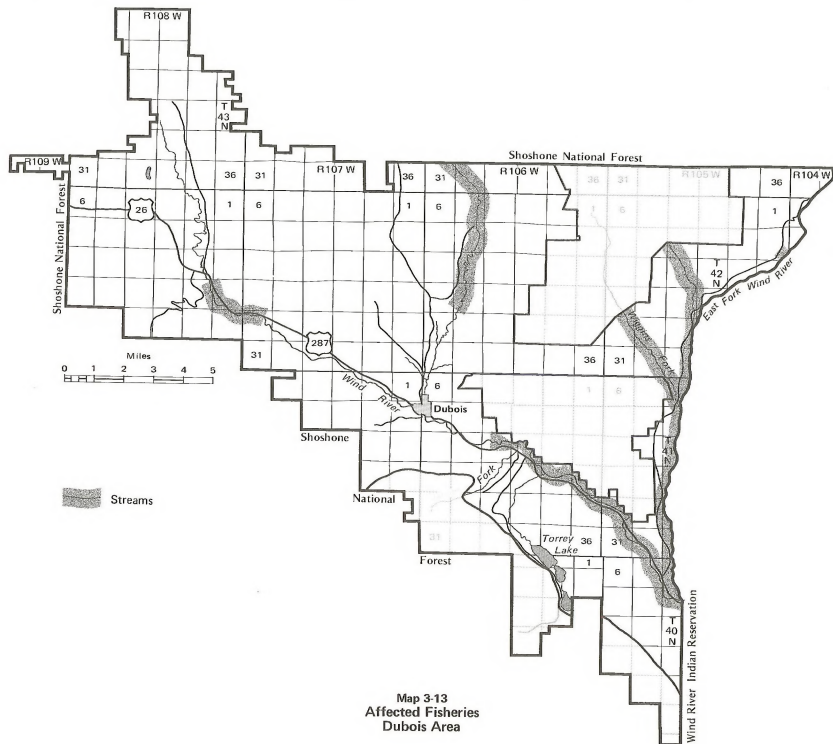
Shoshone National Forest



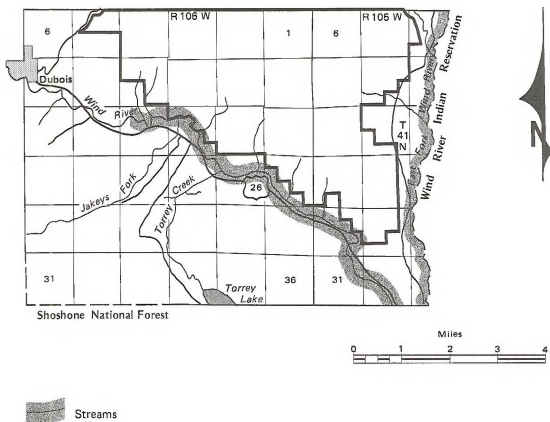


Map 3-11  
Affected Fisheries  
Red Canyon

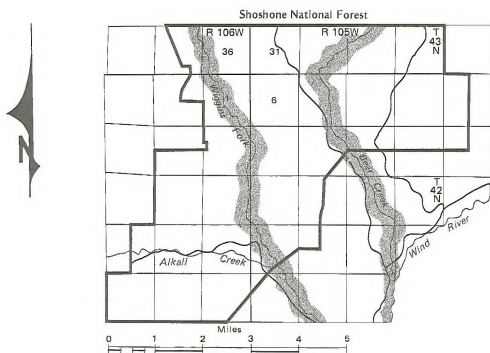









Map 3-14  
Affected Fisheries  
Dubois Badlands



 Streams

Map 3-15  
Affected Fisheries  
East Fork

## Affected Environment

Because of the abundance, high adaptability, very low density, wide ranging habits or affinity for impact resistant, nonimpacted or abundant habitats, many wildlife species will not be significantly affected by the types of management alternatives being considered. Such species/groups will not be addressed further in this document. Other species will not be specifically addressed because of inadequate inventory data, lack of information necessary to predict impacts or their significance, and low public interest.

Wildlife that will be omitted from further specific consideration include amphibians, coyotes, reptiles, bobcats, most song birds, fox, bats, mourning doves, mice and voles, rabbits and hares, ground squirrels, red squirrels, most furbearing mammals, most small predatory mammals, nongame fishes, and warm-water fishes.

Effects of management alternatives on certain important standard wildlife habitat sites, especially those of limited occurrence and those that support abundant and diverse wildlife populations, will be addressed. Analysis of effects on these standard habitat sites will provide a measure of impacts on a variety of wildlife species dependent on these habitats. Many of the animals included in the above listing are highly dependent on these habitats.

### Wildlife Habitat

The Lander Resource Area contains many diverse wildlife habitats. During the summer of 1982, the Gas Hills, Dubois Area, Dubois Badlands, East Fork, and Whiskey Mountain management units, were categorized into 27 standard habitat sites. (A report describing these sites is available for review at the Lander Area office.) Each standard habitat site has a unique vegetative composition and structure and supports a predictable wildlife community.

The Green Mountain Grazing EIS area, which includes Green Mountain, South Pass, Red Canyon, Lander Slope, and Beaver Creek management units have not been categorized into standard habitat types but contains many of the same habitat types found in the remainder of the resource area. Vegetative types and subtypes, as well as standard habitat types for the resource area have been combined in table 3-9 to describe the vegetation as it relates to wildlife habitat for the entire resource area. Acreage estimates by vegetative type or standard habitat type have not been computed for the resource area.

Using sampling transects, casual observations, information from other agencies, and literature sources, over 390 vertebrate species have been documented in the Lander Resource Area. A computer listing of these species and their habitat types (27) is available at the Lander Area office.

Habitat types that provide diverse structural vegetation (e.g., cottonwood floodplain, aspen-conifer woodlands, and lodgepole pine forests) support a great diversity of wildlife because of the large number of sites that can be used for reproduction and/or feeding.

Habitat types associated with running and standing water (e.g., wetlands, sub-irrigated meadows, and willow floodplains) also support a large number of wildlife species. These wetland/riparian habitats are important to a large number of migrants as well as to a diverse population of seasonal residents. The diverse plant composition and structure provided by these habitats supports wildlife numbers and diversity several times greater than the surrounding upland sites. All riparian habitat types share the following characteristics: (1) they create well defined habitat zones within the drier surrounding areas; (2) they make up a minor proportion of the surrounding area; (3) they are more productive in terms of plant and animal biomass; and (4) they are a critical source of diversity within the rangelands (Thomas et al. 1980).

The woodland and forest habitats provide many of the same types of structural layers as the wetland/riparian sites. However, because of the absence of open water, wildlife species diversity is usually less than that found in the riparian areas.

Shrublands lack the true canopy of the forest and woodland sites, which reduces the total number of wildlife species utilizing these types. Still, the various shrub types support a fairly diverse population of wildlife species, and provide key wintering habitat for a large number of big game animals. The big sagebrush-mixed grass steppe, tall sagebrush steppe, and mixed shrub steppe make up a large percentage of the big game wintering habitat.

The 27 standard habitat sites within the Gas Hills Planning Unit have been ranked by management priority into three categories (table 3-10). The habitat types that commonly support a large number of wildlife species are not common in the planning unit.

Because moderate-priority habitats are usually of lesser importance to wildlife and normally are in greater supply than high-priority habitats, they require sound management to ensure main-

**TABLE 3-9**  
**MAJOR VEGETATION TYPES**

Vegetative Type	Subtype	Grasses/Grasslike	Forbs	Shrubs/Trees	Associated Wildlife Habitat Type
Grass	Short Grass	Western wheatgrass Thickspike wheatgrass Bluebunch wheatgrass Needleandthread Sandberg bluegrass Indian ricegrass Blue grama Idaho fescue Prairie junegrass Threadleaf sedge	Phlox Wild buckwheat Pussytoes Aster	Big sagebrush Douglas rabbitbrush	Highland short steppe Sagebrush-mixed steppe Sagebrush-mixed grass steppe Lowland short steppe
Meadow/Riparian	Wet meadow Riparian	Thickspike wheatgrass Quackgrass Kentucky bluegrass Tufted hairgrass Mat muhly Rushes Sedges Alkali cordgrass Inland saltgrass	Thistle Iris Lupine Phlox Horsetail Western yarrow	Rubber rabbitbrush Narrowleaf cottonwood Water birch Dogwood Common chokecherry Currant Juniper Shrubby cinquefoil Willow Big sagebrush Wild rose	Riparian grassland Aspen riparian woodland Cottonwood floodplain Willow floodplain Wetland Subirrigated meadow Saline subirrigated meadow
Sagebrush	Big sagebrush Rabbitbrush Black sagebrush	Western wheatgrass Thickspike wheatgrass Bluebunch wheatgrass Sandberg bluegrass Indian ricegrass Threadleaf sedge Needleandthread	Phlox Wild buckwheat Lupine Pussytoes Aster Milkvetch Indian paintbrush Plains prickly pear Penstemon Vetch	Basin big sagebrush Black sagebrush Wyoming big sagebrush Douglas rabbitbrush Rubber rabbitbrush Broom snakeweed Silver sagebrush	Greasewood-sagebrush steppe Big sagebrush-rabbitbrush steppe Yucca-mixed grass steppe Black sagebrush steppe Silver sagebrush steppe Tall sagebrush steppe
Greasewood/Saltbush	Black greasewood Saltbush	Inland saltgrass Alkali sacaton Needleandthread Thickspike wheatgrass Bottlebrush squirreltail	Pursh seepweed Dock Phlox Lomatium Plains prickly pear Pepperweed	Black greasewood Big sagebrush Gardner's saltbush Winterfat Bud sagebrush Douglas rabbitbrush Broom snakeweed	Greasewood-sagebrush steppe Saltbush steppe Greasewood steppe Mixed shrub steppe Spiny hopsage steppe

**TABLE 3-9 (Continued)**  
**MAJOR VEGETATION TYPES**

Vegetative Type	Subtype	Grasses/Grasslike	Forbs	Shrubs/Trees	Associated Wildlife Habitat Type
Blue grama	Globemallow Birdsfoot sagebrush	Shadscale			
Mountain shrub	Bitterbrush Mountain mahogany Other mountain shrubs	Bluebunch wheatgrass Sandberg bluegrass Spike fescue Idaho fescue Mountain brome Threadleaf sedge	Western yarrow Violet Common dandelion Lupine Cinquefoil Arnica Balsomroot Wax current Bush backspirea	Antelope bitterbrush Snowberry Big sagebrush Skunkbush sumac Rubber rabbitbrush Silver sagebrush Common chokecherry Wild rose Ceanothus	Bitterbrush-sagebrush steppe Mountain shrubland Sumac-wyethia steppe
Juniper	Juniper	Western wheatgrass Threadleaf sedge Bluebunch wheatgrass Idaho fescue Indian ricegrass Needleandthread Green needlegrass	Indian paint- brush Larkspur Penstemon Goldenweed	Utah juniper Common juniper Big sagebrush Winterfat	Utah juniper woodland Mountain shrubland Utah juniper woodland - Limber pine woodland
Conifer	Lodgepole pine Limber pine Engelmann spruce Douglas fir Aspen	Bluegrasses Sedges Mountain brome Idaho fescue	Arnica Balsomroot Oregon grape Penstemon Bedstraw Vetch Hawksbeard	Limber pine Lodgepole pine Serviceberry Common chokecherry Quaking aspen Huckleberry Antelope bitterbrush Douglas fir Engelmann spruce	Limber pine woodland Quaking aspen woodland Aspen-conifer woodland Douglas fir forest Lodgepole pine forest
Waste	Rock Barren Steep slope Dense timber	If vegetation is present at all, most of the plant species associated with the waste subtypes in the Lander RMP area are those associated with the shortgrass, sagebrush, Mountain shrub, or Juniper types above.			Limber pine woodland Utah juniper woodland Mountain shrubland Badland Castle Garden rockland Sweetwater rockland

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tenance or improvement of the vegetative composition and structure.

Low-priority habitats usually have a reduced vegetative diversity, with only one or two structural layers. These types can be more heavily used by conflicting resources without causing significant wildlife impacts because of their abundance and lower wildlife value.

### Big Game Mammals

Six species of big game mammals, elk, mule deer, pronghorn antelope, bighorn sheep, moose, and white-tailed deer, are yearlong residents of the Lander Resource Area. The location of the herd unit area boundaries for each big game species are shown on maps 3-16 through 3-20. Since white-tailed deer populations are so scattered and relatively little data are available on population levels, no herd unit areas have been established in the resource area. Crucial and important ranges and habitat areas for big game and sage grouse are shown on maps 3-21 through 3-26.

Tables 3-11 through 3-15 show statistics for each big game herd such as population objective, acres of habitat in the Lander Resource Area and acres of high-value habitat. The data in these tables are related to the major resource management units in the right column of the tables.

Grazing by domestic livestock occurs in all the herd unit areas. The extent of grazing and its impact on big game species varies throughout the resource area. Wild horses compete for forage with other grazing animals, mainly in the Green Mountain and Beaver Creek management units.

The opportunity to improve wildlife habitat, using prescribed burns and innovative methods of fire suppression, exist in all the management units, except the Dubois Badlands where vegetation is too sparse to sustain a fire.

The following narrative describes the general habitat requirements of each big game species and identifies management units where specific big game management practices are currently taking place.

TABLE 3-10  
RANKING OF STANDARD HABITAT TYPES<sup>1</sup>

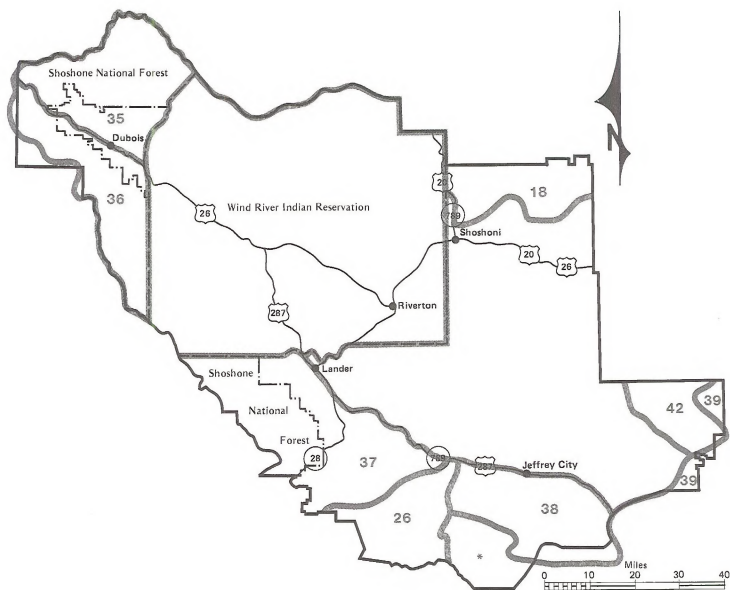
High Priority <sup>2</sup>	Moderate Priority <sup>3</sup>	Low Priority <sup>4</sup>
Wetland	Tall sagebrush steppe	Greasewood-sagebrush steppe
Cottonwood floodplain	Douglas fir forest	Greasewood steppe
Willow floodplain	Utah juniper woodland	Lowland short steppe
Aspen-conifer woodland	Limber pine woodland	Silver sagebrush steppe
Subirrigated meadow	Limber pine-Utah juniper woodland	Saltbush steppe
Lodgepole pine forest	Spiny hopsage steppe	Mixed shrub steppe
Castle Gardens rockland	Sweetwater rockland	Badlands
Saline subirrigated meadow	Highland short steppe	Black sagebrush steppe
Open aquatic	Sumac-wyethia steppe	Yucca-mixed grass steppe
	Big sagebrush-mixed grass steppe	

<sup>1</sup> Ranking is based on the wildlife communities (total species, number of breeders, number of rare species) combined with the availability of each type.

<sup>2</sup> High-priority habitats are defined as those habitats that require intensive management actions (data collection, enhancement, protection) in order to maintain their productivity as diverse wildlife communities.

<sup>3</sup> Moderate-priority habitats are defined as those habitats that require less intensive management to maintain their productivity as wildlife communities.

<sup>4</sup> Low-priority habitats are defined as those that can be more heavily used by conflicting resources in order to maintain the more important (higher priority) wildlife habitats.



— Herd Unit Area Boundary

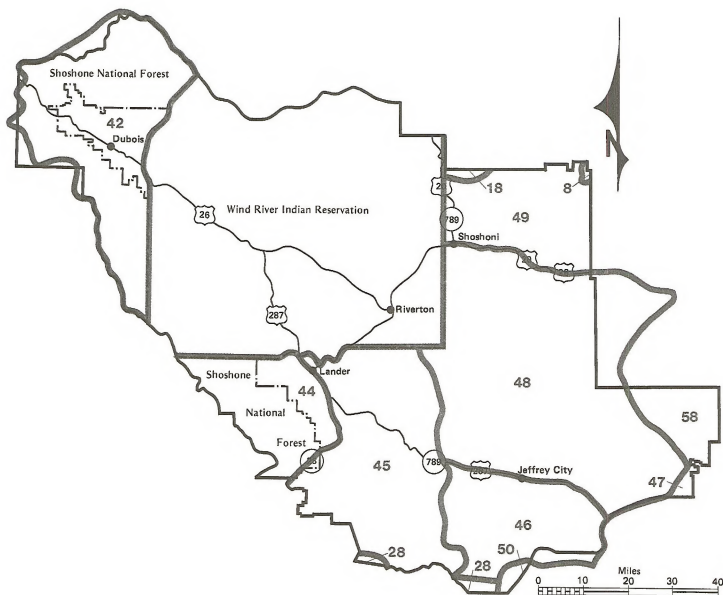
Herd Unit Number and Name

- 18 Upper Nowood
- 26 Steamboat
- 35 Wiggins Fork
- 36 Warm Springs
- 37 Lander

- 38 Green Mountain
- 39 Ferris
- 42 Rattlesnake
- \* Shamrock

Map 3-16  
Elk Herd Unit Area Boundaries  
Lander Resource Area



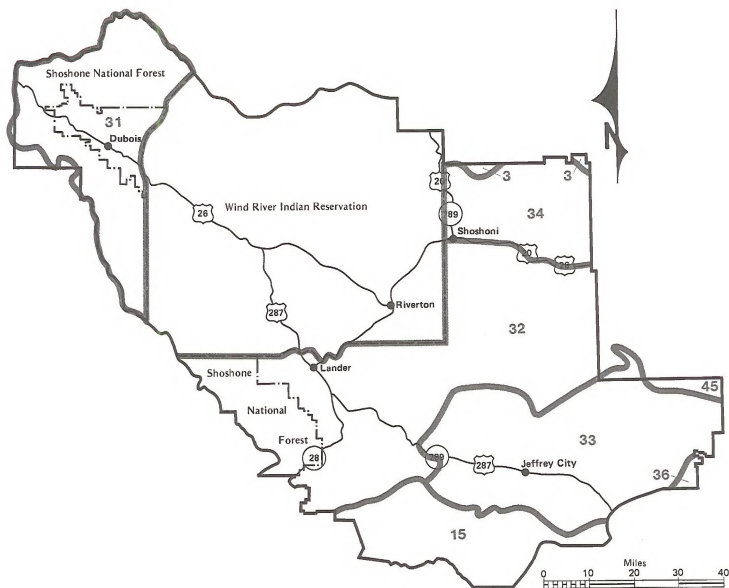


— Herd Unit Area Boundary

Herd Unit Number and Name

- |                    |                   |
|--------------------|-------------------|
| 8 Big Trails       | 46 Green Mountain |
| 18 Copper Mountain | 47 Ferris         |
| 28 Table Rock      | 48 Beaver Rim     |
| 42 Dubois          | 49 Badwater       |
| 44 Lander          | 50 Chain Lakes    |
| 45 Hall Creek      | 58 Rattlesnake    |

Map 3-17  
Mule Deer Herd Unit Area Boundaries  
Lander Resource Area



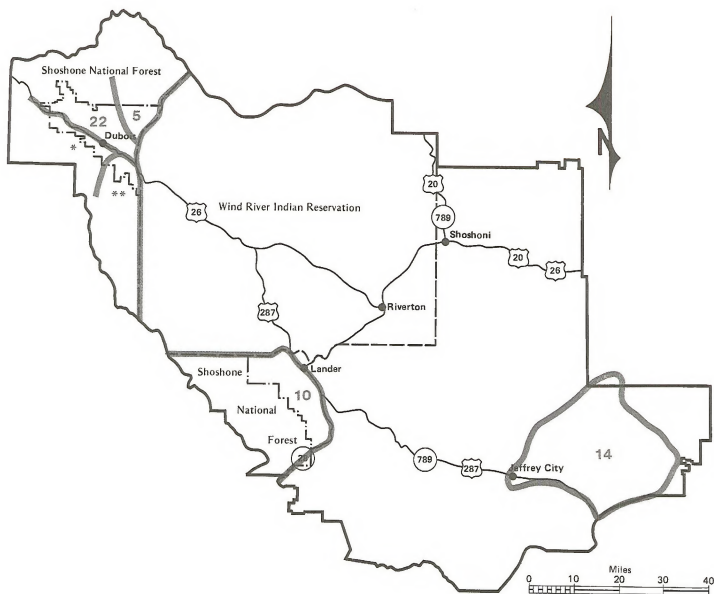
— Herd Unit Area Boundary

Herd Unit Number and Name

- 3 Copper Mountain
- 15 Red Desert
- 31 Wind River
- 32 Fremont

- 33 Sweetwater
- 34 Badwater
- 36 North Ferris
- 45 Rattlesnake

Map 3-18  
Pronghorn Antelope Herd Unit Area Boundaries  
Lander Resource Area



 Herd Unit Area Boundary

Herd Unit Number and Name

- 5 Franc's Peak
- 10 Temple Peak
- 14 Sweetwater Rocks
- 22 Dubois Badlands
- \* Jakey's Fork
- \*\* Dinwoody

Map 3-19  
Bighorn Sheep Herd Unit Area Boundaries  
Lander Resource Area



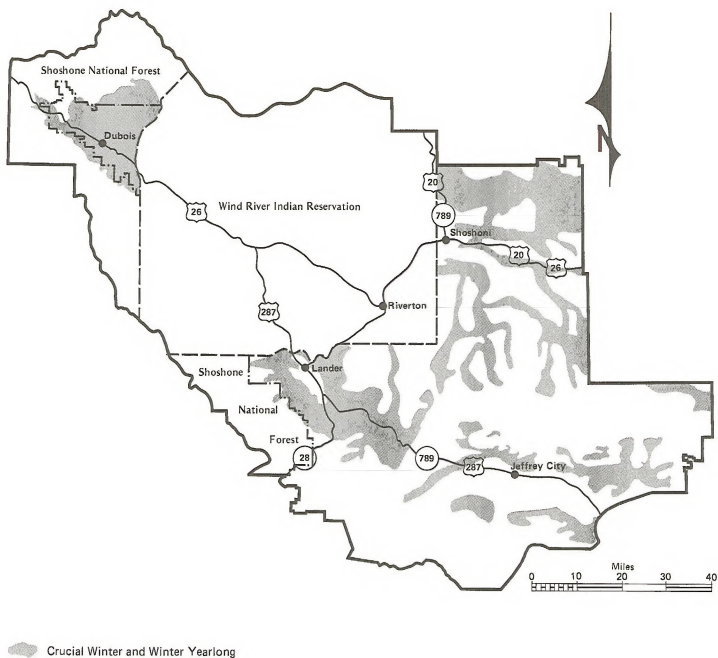
— Herd Unit Area Boundary

Herd Unit Number and Name

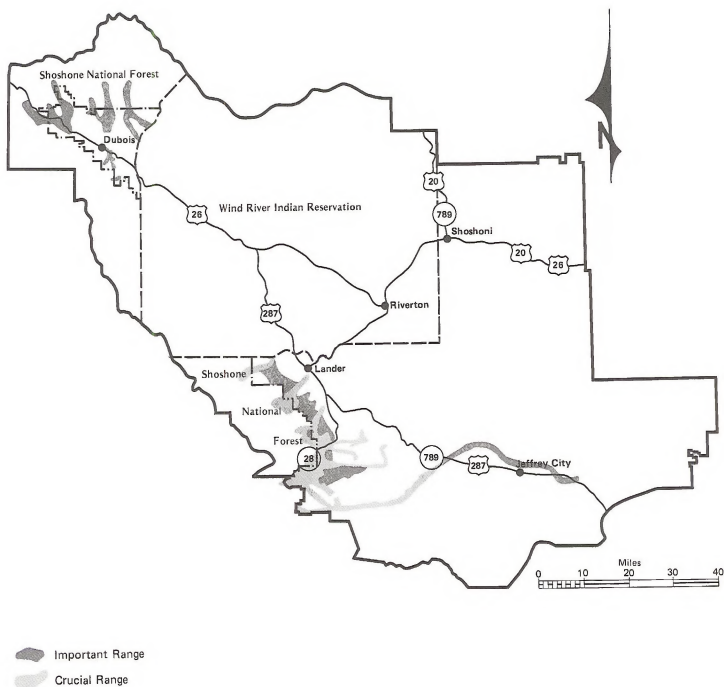
20 Lander

21 Dubois

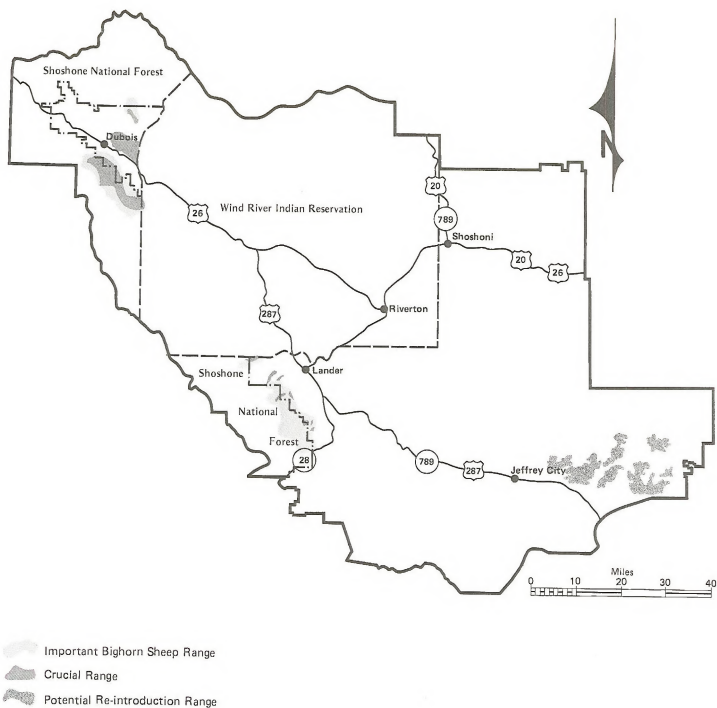
Map 3-20  
Moose Herd Unit Area Boundaries  
Lander Resource Area



Map 3-21  
Important Mule Deer Ranges  
Lander Resource Area



Map 3-22  
Important Moose Ranges  
Lander Resource Area

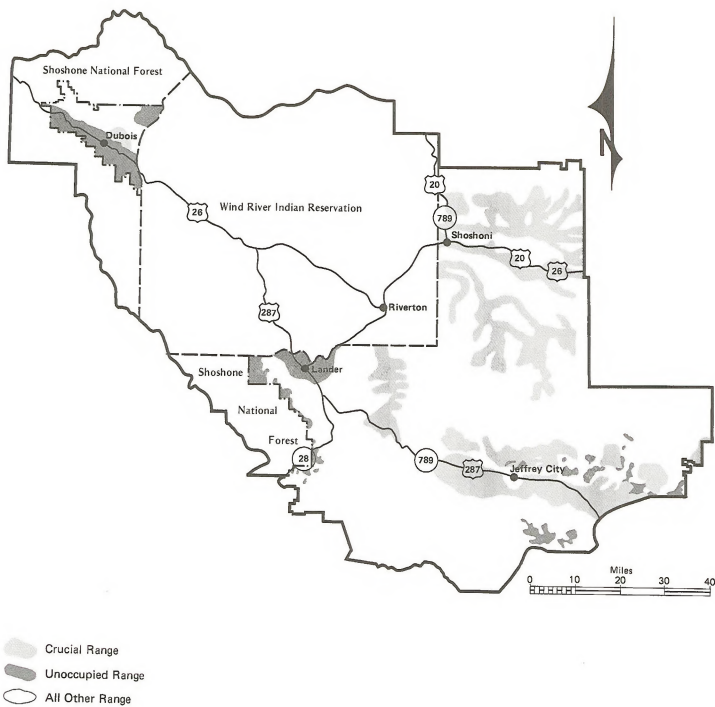


Map 3-23  
Important Bighorn Sheep Ranges  
Lander Resource Area

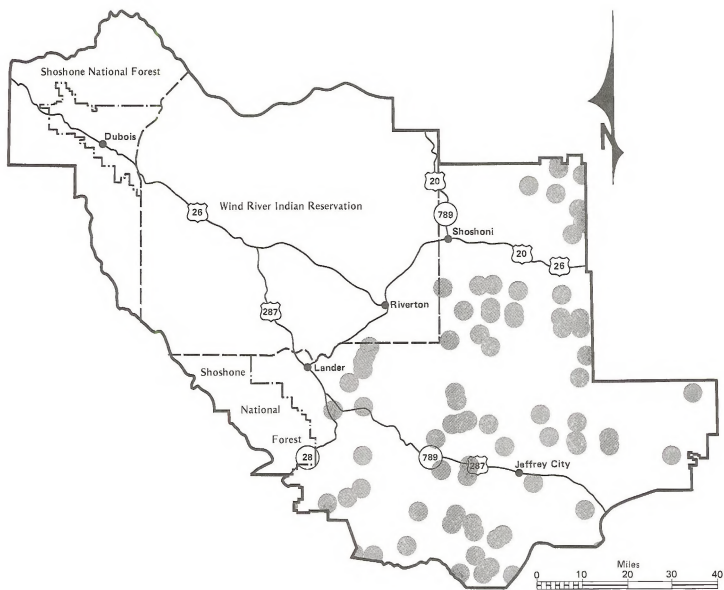




Map 3-24  
Important Elk Ranges  
Lander Resource Area



Map 3-25  
Pronghorn Antelope Ranges  
Lander Resource Area



● Sage Grouse Breeding - Nesting Areas

Map 3-26  
Sage Grouse Breeding - Nesting Areas  
Lander Resource Area

## Affected Environment

**TABLE 3-11**  
**ELK HERD UNIT AREA DATA - LANDER RESOURCE AREA**

Elk Herd Unit Area Name and Number	Wyoming Game and Fish Department Population Objective	Approximate Percent of Population in Lander R.A.	Acreage of Occupied Habitat in Lander R.A.	Acreage of High-Value Habitat With Potential to be Significantly Impacted by One or More Resource Management Alternatives	Major Resource Management Units in Herd Unit Area
Lander (No. 37)	2,300	100%	93,497	35,271 (Winter) 21,213 (Crucial/Winter) 7,259 (Winter-Yearlong)	Lander Slope Red Canyon South Pass Sweetwater Canyon Beaver Creek
Green Mtn. (No. 38)	375	100% Yearlong	87,833	15,551 (Crucial/Winter) 17,567 (Winter) 5,283 (Calving)	Green Mountain Beaver Creek
Wiggins Fork (No. 35)	3,519 (Stable)	95% Winter Less than 5% Summer	55,059	30,140 (Crucial/Winter) 23,684 (Winter) 3,766 (Calving)	East Fork Dubois Badlands Dubois Area
Warm Springs (No. 36)	750 (Stable)	50% Winter 5% Summer	25,767	19,749 (Winter)	Whiskey Mtn. Dubois Area
Upper NoWood (No. 18) (Copper Mtn.)	900	5% Winter 20% Summer	49,143	15,453 (Winter-Yearlong) 7,219 (Calving)	Gas Hills Copper Mtn.
Rattlesnake (No. 42)	150	50% to 100% Yearlong	28,804	28,804 (Winter-Yearlong)	Gas Hills
Ferris (No. 39)	350	5%-Yearlong	8,000		Gas Hills
Steamboat (No. 26)	700	10% Severe Winters	3,910 (Occasional Use)		Beaver Creek Sweetwater Canyon
Shamrock <sup>1</sup>	75		0		Beaver Creek

<sup>1</sup> Herd unit number undetermined.

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**TABLE 3-12**  
**BIGHORN SHEEP HERD UNIT AREA DATA - LANDER RESOURCE AREA**

Bighorn Sheep Herd Unit Area Name and Number	Wyoming Game and Fish Department Population Objective	Approximate Percent of Population in Lander R.A.	Acreage of Occupied Habitat in Lander R.A.	Acreage of High-Value Habitat With Potential to be Significantly Impacted by One or More Resource Management Alternatives	Major Resource Management Units in Herd Unit Area
Temple Peak (No. 10)	250		18,648	4,724 (Crucial/Winter-Yearlong) 13,924 (Winter-Yearlong)	Lander Slope Red Canyon
Francis Peak (No. 5)	1,000		3,155	370 (Crucial/Winter) 2,785 (Summer)	East Fork Dubois Area
Badlands (No. 22)	60	100%	15,644	933 (Crucial/Winter) 14,020 (Crucial-Yearlong) 691 (Summer)	Dubois Area Dubois Badlands East Fork
Sweetwater Rocks (No. 14)	Undetermined (Current Population Less than 10)	100-Yearlong	Undetermined	44,925 (Winter-Yearlong) Potential Re-establishment Area	Beaver Creek Gas Hills Sweetwater Rocks
Jakey's Fork <sup>1</sup>	560	100%	20/36	3,602 (Crucial/Winter-Yearlong) 15,765 (Summer) 769 (Winter)	Dubois Area
Dinwoody <sup>1</sup>	400	100%	14,132	2,945 (Crucial/Winter-Yearlong) 2,034 (Winter)	Whiskey Mt.

<sup>1</sup> Herd unit number undetermined.

### Elk

A variety of standard habitat types provide the seasonal requirements for several herds of elk in the Lander Resource Area. Habitat selection varies from season to season, with the elk being most restricted during severe winter conditions. Elk require a combination of feeding sites (upland meadow, sagebrush-mixed grass and mountain shrub), security and thermal cover (aspen and conifer woodlands) for their daily activity.

During the summer, elk use the higher elevation woodland types for security and thermal cover. The upland meadows and sagebrush-mixed grass sites provide summer forage.

With the onset of winter, the elk migrate to the lower elevation winter ranges, concentrating on the crucial winter ranges during periods of severe weather. Snow depths limit elk to the more open,

windswept areas, usually consisting of sagebrush-mixed grass, big sagebrush-rabbitbrush, and some mountain shrub communities.

The following management units provide habitat of major importance to elk herds in the resource area.

**Green Mountain Management Unit.** Green Mountain provides both summer and winter habitat for about 375 elk. Maintenance of adequate elk cover, as part of the forest ecosystem, is a primary wildlife objective. Currently, small tracts of merchantable timber stands are logged until a cover-forage ratio of approximately 40 to 60 percent has been reached.

Uranium exploration, mining, oil and gas activity, livestock and wild horse grazing, and ORV use can potentially create conflicts with elk management, depending on their intensity.

# Affected Environment

TABLE 3-13  
MULE DEER HERD UNIT AREA DATA - LANDER RESOURCE AREA

Mule Deer Herd Unit Area Name and Number	Wyoming Game and Fish Department Population Objective	Approximate Percent of Population in Lander R.A.	Acreage of Occupied Habitat in Lander R.A.	Acreage of High-Value Habitat With Potential to be Significantly Impacted by One or More Resource Management Alternatives	Major Resource Management Units in Herd Unit Area
Dubois (No. 42)	4,000	100%	162,913	44,860 (Crucial/Winter-102,149 (Winter-Yearlong))	East Fork Dubois Badlands Whiskey Mtn. Dubois Mgmt. Area
Beaver Rim (No. 48)	3,100	90% Summer & Fall 95% Winter & Spring	700,385	65,367 (Crucial/Winter) 292,628 (Winter-Yearlong)	Sweetwater Rocks Gas Hills Beaver Creek
Badwater (No. 49)	7,500	65% Summer & Fall 70% Winter & Spring	242,223	92,826 (Crucial/Winter) 141,097 (Winter-Yearlong))	Copper Mtn. Gas Hills
Big Trails (No. 8)	13,892	Less Than 1% Spring-Summer & Fall	3,478		Gas Hills
Lander (No. 44)	4,700	100%	97,848	45,283 (Crucial/Winter) 30,603 (Winter-Yearlong)	Lander Slope Red Canyon
Hall Creek (No. 45)	4,100	97% Summer & Winter	449,512	90,776 (Crucial/Winter) 65,353 (Winter-Yearlong)	South Pass Sweetwater Canyon Beaver Creek
Green Mtn. (No. 46)	2,000	98% Yearlong	163,201	4,302 (Crucial/Winter) 42,216 (Winter-Yearlong)	Green Mtn.
Copper Mtn. (No. 18)	4,500	2% Yearlong	10,210	2,569 (Crucial/Winter)	Gas Hills
Chain Lakes (No. 50)	200		22,918 (Occasional Use)		Beaver Creek
Table Rock (No. 28)	450		25,933 (Occasional Use)		Beaver Creek
Rattlesnake (No. 58)	2,000	25% Yearlong	142,414	25,120 (Winter-Yearlong)	Gas Hills
Ferris (No. 47)	5,000	5% Yearlong	18,572	582 (Winter-Yearlong)	Gas Hills

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**TABLE 3-14**  
**PRONGHORN ANTELOPE HERD UNIT AREA DATA -**  
**LANDER RESOURCE AREA**

Pronghorn Antelope Herd Unit Area Name and Number	Wyoming Game and Fish Department Population Objective	Approximate Percent of Population in Lander R.A.	Acreage of Occupied Habitat in Lander R.A.	Acreage of High- Value Habitat With Potential to be Significantly Impacted by One or More Resource Management Alternatives	Major Resource Management Units in Herd Unit Area
Red Desert (No. 15)	10,000	10% Winter 25% Summer	449,146	31,403 (Winter-Yearlong)	Beaver Creek Green Mtn. Sweetwater Canyon
Wind River (No. 31)	300	100%	92,748	12,198 (Crucial/Winter- Yearlong) 22,912 (Winter-Yearlong)	Dubois Area East Fork Dubois Badlands Whiskey Mtn.
Sweetwater (No. 33)	7,000	95% Winter 90% Summer	903,934	233,087 (Crucial/Winter- Yearlong)	Beaver Creek Sweetwater Rocks Green Mtn.
N. Ferris (No. 36)	5,000	15% Winter 2.5% Summer	17,658		Gas Hills
Copper Mtn. (No. 3)	2,750	Less Than 3% Spring-Summer- Fall	12,907		Gas Hills
Badwater (No. 34)	3,000	73% Summer & Fall 75% Winter & Spring	391,991	103,587 (Crucial/Winter- Yearlong) 24,685 (Winter-Yearlong)	Gas Hills Copper Mtn.
Fremont (No. 32)	7,100	85% Summer & Fall 89% Winter Spring	1,262,308	202,276 (Crucial/Winter- Yearlong) 200,955 (Winter-Yearlong)	Gas Hills Beaver Creek Lander Slope Red Canyon South Pass
Rattlesnake (No. 45)	6,000	10% Spring- Summer-Fall 5% Winter	36,453	19,311 (Winter-Yearlong)	Gas Hills

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**TABLE 3-15**  
**MOOSE HERD UNIT AREA DATA - LANDER RESOURCE AREA**

Moose Herd Unit Area Name and Number	Wyoming Game and Fish Department Population Objective	Approximate Percent of Population in Lander R.A.	Acreage of Occupied Habitat in Lander R.A.	Acreage of High-Value Habitat With Potential to be Significantly Impacted by One or More Resource Management Alternatives	Major Resource Management Units in Herd Unit Area
Lander (No. 20)	300	15% Summer & Fall 50% Winter & Spring	133,832	51,229 (Crucial/Winter-Yearlong) 8,911 (Winter-Yearlong) 14,698 (Crucial/Winter) 48,627 (Winter) 10,367 (Summer)	Sweetwater Canyon  South Pass Red Canyon Lander Slope Beaver Creek
Dubois (No. 21)	350		163,883	38,236 (Winter-Yearlong) 125,647 (Summer)	Dubois Area Whiskey Peak Dubois Badlands East Fork

**Lander Slope Management Unit.** The Lander Slope and the Red Canyon Management units provide crucial winter range for a large part of the Lander elk herd. In recent years, there has been interest in oil and gas leasing and phosphate leasing and prospecting on the slope. A number of rural homesite subdivisions have been developed on private lands on the lower portions of the slope, and the state of Wyoming has improved access and proposed timber harvesting in the Squaw Creek area. All these activities pose potential conflicts with elk crucial winter range on the slope.

**Red Canyon Management Unit.** The Red Canyon Management Unit consisting of approximately 23,000 acres, contains the Red Canyon Wildlife Habitat Management Unit, which was established by the Wyoming Game and Fish Department (WGFD) in 1958. This habitat management unit is made up of about 1,800 acres, which are owned or controlled by the WGFD. The federal government retains title to most of the minerals in the unit and has about 90 acres of public land inside the unit fence. The Red Canyon Management Unit was established to ensure reliable high-quality winter habitat for elk in the Lander Herd Unit and to alleviate elk depredation on private lands.

Before establishment of the wildlife habitat management unit, elk in the area were forced to compete for all their forage on public grazing lands and private haylands. The unit is now managed to ensure a dependable quantity of high-quality winter habitat for at least part of the elk herd's winter needs.

In association with the Red Canyon unit, BLM and WGFD developed a Memorandum of Understanding and Cooperative Agreement, which provides for reservation of 500 animal unit months (AUMs) of grazing privileges for elk use in the greater Red Canyon elk winter range area adjacent to the unit. This area is essentially the Red Canyon Creek drainage to the Little Popo Agie River Canyon. The AUMs set aside for elk come from what is now grazing allotment No. 1908, the Slingerland allotment, and were formerly attached to the Facinelli base property, now the Red Canyon Unit.

**East Fork Management Unit.** The East Fork Big Game Winter Range in this management unit is one of the most outstanding "managed" elk winter ranges in the West. The winter range covers nearly 17,000 acres north of Dubois in the drainages of the East Fork of Wind River, Bear Creek and Wiggins Fork. As many as 4,000 elk summer on



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the Shoshone National Forest to the north and migrate south to the lower elevations in the winter.

Migration routes between summer and winter ranges are well defined. Through fencing and habitat management on the winter range, the majority of the elk herd's winter use has been confined to the unit lands. Damage to adjacent private lands during normal winters has been greatly reduced.

Elk will normally avoid an area with unfamiliar sights, sounds, vehicular traffic, and proximity to human activity. Because of the isolation of the summer range, the East Fork elk herd is particularly susceptible to disturbances. Experience has demonstrated that any unusual activity on the winter range causes the elk to flee to surrounding private lands, often causing hay damage and other conflicts with landowners. Return to the higher timbered areas during the winter is impossible because of heavy snow packs.

As a result of WGFD purchases, the Public Land Orders and associated cooperative agreements with the Fish and Wildlife Service (FWS), the applied provisions of the Coordination Act and the Federal Aid in Wildlife Restoration Act, and the East Fork Cooperative Agreement with BLM, the surface management of the East Fork Unit is almost entirely the responsibility of the WGFD for purposes of maintenance, protection and improvement of wildlife, wildlife habitat, and wildlife-based recreation. However, approximately 87 percent of the subsurface mineral estate in the unit is under federal ownership. In 1981, BLM, FWS and WGFD entered into an agreement for the unit. It was the conclusion of the representatives of the three agencies that oil and gas exploration, development and subsequent operational activities would not be compatible with the dedicated use of this area. It was, therefore, recommended that all of the public lands and the patented lands with mineral reservations within the exterior boundaries of the East Fork winter range be excluded from oil and gas leasing. It was further recommended that existing leases continue in effect, and, if production were not obtained during the term of these leases, the leases would not be extended and new leases would not be issued.

### Bighorn Sheep

The habitat requirements for bighorn sheep seem to be keyed to good foraging sites near escape cover (rough terrain). Research has shown that bighorns prefer open grassy ridgetops, slopes, or benches within 100 meters of rocky outcrops, precipitous cliffs, or steep rocky slopes.

Habitat types most commonly used are highland short steppe, sagebrush-mixed grass, big sagebrush-rabbitbrush, and mountain shrub. These habitats provide forbs and grasses, the major components in their diet from late fall to early summer. Sagebrush, rabbit brush and bitterbrush are the principal winter browse species that become especially important during periods of deep snow.

**Lander Slope and Red Canyon Management Units.** Several of the deep canyons that cut through the Lander Slope and Red Canyon management units are habitat for bighorn sheep. Although these canyons do not support a large number of bighorns, there is potential to improve the habitat and build these herds. The same activities that could affect elk on the Lander Slope have the potential to conflict with bighorn sheep.

**Whiskey Mountain Management Unit.** Bighorn sheep wintering in the Whiskey Mountain-Jakey's Fork-Torrey Creek area south of Dubois, Wyoming, are one of the largest and most visible herds in the continental United States. In 1969, after years of cooperative efforts and emerging recognition of the importance of this bighorn population, WGFD, U.S. Forest Service, Shoshone National Forest, and BLM entered into the Whiskey Mountain Cooperative Agreement. This agreement directed the three agencies to manage the area in order to protect and enhance its value as a bighorn sheep range, and it directed the field offices of these agencies to prepare a comprehensive habitat management plan to accomplish these objectives.

The goal of WGFD, BLM and U.S. Forest Service (USFS) is to manage the Whiskey Mountain area to perpetuate and emphasize bighorn sheep and their habitat. The habitat will be managed to perpetuate a bighorn sheep herd for sport hunting, aesthetics, transplant stock (over 1,300 sheep have been transplanted in five states), educational and scientific values, and to obtain a better understanding of the ecological needs of the sheep.

As a result of the Whiskey Mountain Cooperative Agreement and the Whiskey Mountain Bighorn Sheep Comprehensive Management Plan, BLM segregated 2,599 acres from all forms of appropriation, including the mining laws and mineral leasing laws in 1970. These segregations were recently reviewed and retained, pending land-use planning and possible protective withdrawal. Also, as a result of recent offers to lease a large part of the winter range for oil and gas, the entire area of federal mineral estate in

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the Whiskey Mountain area outside the national forest was evaluated. As a result of this evaluation and the value of the bighorn sheep range, BLM State Director's decision was that there would be no federal oil and gas leasing on BLM-administered lands within the exterior boundaries of the Whiskey Mountain Winter Range.

BLM has also agreed to retain public lands in the winter range. WGFD has acquired three tracts of land in the foothills of Whiskey Mountain for wildlife forage: one in 1954, one in 1957, and one in 1973, totalling 5,840 acres. USFS has also designated an area on Sheep Ridge solely for wildlife forage, and BLM has designated 1,260 acres for the same purpose. WGFD has determined that bighorn sheep will have priority use over other wildlife species in the Whiskey Mountain area. From a habitat standpoint, USFS and BLM have determined that bighorn sheep will have priority over other domestic and wildlife species.

**Dubois Badlands.** The Dubois Badlands provide primarily yearlong range for about 50 bighorn sheep. This relatively small area with low-forage production meets the habitat requirements for sustaining a viable bighorn herd, despite periodic heavy grazing by other ungulates. The WGFD conducts a limited hunt in the area, and several trophy rams have been taken in recent years.

### Deer

Mule deer are distributed throughout the seasonal ranges within the resource area. In general, mule deer prefer habitat types that are in the early stages of plant succession and contain a large quantity of shrubs. Mule deer use the woody riparian, shrublands, Utah juniper woodland, and aspen woodland habitat types extensively during spring, summer and fall. These types provide adequate forage areas with security cover. Also, cover for fawning and succulent vegetation for lactating females is provided by these habitats.

With the onset of winter, deer are more restricted in their habitat selection. Deep snow makes many summer habitat types unavailable, concentrating deer at lower elevations. Wintering mule deer are often found in the Utah juniper, limber pine juniper, big sagebrush-rabbitbrush, and bitterbrush habitat types.

White-tailed deer utilize the willow-waterbirch and cottonwood habitat types along the major creeks and rivers. Population levels are low and data are scarce for these isolated herds.

### Pronghorn Antelope

Pronghorn antelope are the most abundant and visible big game species in the resource area. Antelope inhabit open rangelands with a wide variety of habitat types rather than a monotypic vegetative community. These types have a high density of grass, forbs and shrubs that produce an abundance of succulent vegetation.

### Moose

Moose are most abundant in the resource area during the winter, when they move out of the higher elevations of the Shoshone National Forest. Wetland-riparian habitat characterized by cottonwoods, willows and aspens comprise most of the prime moose habitat. Riparian habitat types that are heavily wooded are preferred for calving.

Major forage consists of browse such as willow and other shrubs, with grasses and forbs making up the rest of the diet.

The main winter concentrations of moose occur in the South Pass Management Unit and in the upper Sweetwater River area of the Beaver Creek Management Unit. The Dubois Area, Whiskey Peak, Dubois Badlands, and East Fork management units provide summer range and in some cases winter-yearlong range for the Dubois Herd Unit.

Rural development of homesites on riparian areas on the Lander Slope is resulting in a direct loss of moose crucial winter range on private land.

### Upland Game Birds

#### Sage Grouse

Sage grouse are the most common and widespread game bird in the Lander Resource Area. Seventy-eight sage grouse strutting grounds have been documented during spring surveys. A list of the location and status of these strutting grounds is available in the Lander Resource Area office.

During the spring, sage grouse concentrate on traditional strutting grounds where courtship and breeding occur. These grounds are usually in openings within a sagebrush stand where the adjacent sagebrush canopy averages 32 percent (Wallestad and Schladweiler 1974).

Sage grouse nests are usually found under sagebrush on drier sites, in preference to the dense, tall sagebrush found on moist areas. The

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majority of the nests are located within 2 miles of the strutting ground, with occasional nests found 5 to 6 miles away (Wallestad and Pyrah 1974). Sage grouse avoid large stands of dense sagebrush (Klebenow 1972 and Wallestad 1971).

Sage grouse tend to stay within 1.5 miles of water during the warm, dry summer periods. The critical spring, summer and fall ranges should have water to support the hens and their broods. During normal precipitation years, water is generally available in most of the resource area. But water is a habitat limiting factor in some areas.

To sustain current sage grouse population levels, three important habitat components—strutting/nesting grounds, brood-rearing areas and wintering areas—should be maintained. Currently, a statewide standard stipulation protects the strutting ground and a ¼ mile radius from the center of the ground from surface disturbance. From the ¼ mile distance to 2 miles from the center of the ground, nesting habitat is protected from surface disturbance during the nesting season.

The more important brood rearing areas are usually found in meadow-riparian areas along intermittent and perennial streams. Stipulations that protect these riparian areas benefit sage grouse.

Wintering areas are not well documented in the resource area. Typical wintering areas contain stands of tall sagebrush that stand above the snow and provide cover and food. Areas that blow free of snow are also used by sage grouse in the winter. These snow free areas sometimes overlap big game crucial winter ranges. Seasonal stipulations that protect big game crucial winter ranges provide protection for some sage grouse wintering areas.

Loss of sagebrush habitat can be a major cause of sage grouse population declines (Patterson 1952). The majority of the habitat alterations and losses that have occurred in the Lander Resource Area are attributed to agricultural practices such as sagebrush spraying and other sagebrush type conversion practices.

Loss of habitat within the resource area can also be attributed to:

- Oil and gas activity - (road and drill pad construction combined with habitat modification during pipeline construction).
- Livestock grazing.

Changes in vegetative composition, density and structure

Disturbance of nesting hens and nest trampling

Removal of brood cover in meadows

—Surface disturbance caused by mineral exploration.

—Failure and or abandonment of key water projects in dry areas.

—Dewatering of lower sections of small streams because of irrigation diversions.

### Chukar Partridge

Wyoming introduced chukars into the state in 1939 and began hunting them in 1955. Chukars prefer rocky slopes for escape and roosting cover. Optimum habitat consists of about 50 percent talus slopes, rock outcrops, cliffs and bluffs, and 50 percent sagebrush, bunch grasses (*Agropyrons*), bluegrasses (*Poa*), and annuals such as cheatgrass (*Bromus tectorum*1). The availability of water during the summer months is a significant habitat factor.

In the Lander Resource Area, the best chukar habitat exists along Twin Creek; in the Sheep Mountain area; along the Lander Slope and Red Canyon areas, especially in and adjacent to the many canyons; and in the Cottonwood Creek drainage. Good habitat is also found along the south slopes and drainages of the Copper and Lysite mountains. Attempts were made in the past to establish chukar populations in the Sweetwater Rocks and along Beaver Rim, but these populations were apparently not very successful.

Chukar populations appear to fluctuate, primarily with the severity of winter conditions and weather conditions during spring nesting in areas with established populations.

### Hungarian Partridge

Hungarian Partridge or "huns" are found near agricultural lands in some parts of the resource area. (These populations are thought to have originated from private releases in the vicinity of Lander and may have spread south to the Badwater Creek country from Montana via the Big Horn Basin.) Populations exist in the lower Beaver Creek area around Yellowstone Ranch, in the vicinity of Red Canyon and the Lander Valley, in Lyons Valley, and in the Bridger Creek and Lysite Creek drainages north of Badwater Creek.

Huns prefer grass-dominated, prairie-type habitats for nesting. Forbs in these communities

## Affected Environment

provide concealment of nests in spring and sources of food throughout the year. Forb-dominated communities, such as alfalfa fields, are not preferred nesting areas but offer some of the earliest spring vegetative cover when residual grass cover is absent (Weigard 1977).

Mowing of hay, application of insecticides, burning of waste areas, and trampling of nests by livestock are potential causes of mortality in huns. However, agricultural operations that leave good cover in agricultural edge areas are usually beneficial to huns in areas where populations are present.

### Blue and Ruffed Grouse

Blue grouse and occasionally ruffed grouse are found in preferred habitats on Green Mountain and on the east end of Crooks Mountain. The forest-wood land edges in the vicinity of South Pass, the Lander Slope, and Upper Wind River Valley (Dubois) also support appreciable stands of preferred habitat and fair populations of blue and ruffed grouse.

Preferred standard habitat types include the mountain shrubland, aspen-conifer woodland, quaking aspen woodland, Douglas fir forest, limber pine woodland and the lodgepole pine forest. The edges between these types and small riparian areas within these types are especially preferred. Breeding, nesting and brood rearing areas are typically found in the edge areas. Fire and timber harvesting as well as other large scale surface disturbing operations such as mining can damage or destroy blue and ruffed grouse habitat. These activities can also have beneficial effects if proper vegetative structure and diversity is created or restored as a result of the activity. Grazing pressure forces grouse out of areas where herbaceous forage utilization is excessively high. Grouse move to areas of steep slopes and heavy thickets less utilized by livestock.

Blue and ruffed grouse habitat condition or trend is not adequately documented in the resource area, but conditions are known to vary from poor to excellent in different sites.

### Raptors

Raptors or birds of prey include eagles, falcons, hawks, and owls. Because they occupy an ecological position at the top of the food chain, they act as biological indicators of environmental quality.

Seventeen species of raptors are recorded in the resource area. Two species, the peregrine falcon and the bald eagle, are listed as endangered by the U.S. Fish and Wildlife Service. Fourteen species are known to nest in the resource area.

The nesting-reproductive season is considered to be the most critical period in the raptor life cycle since it determines population productivity, short-term diversity, and long-term trends. Most species have specific nest site requirements, which are key factors in nest site selection and reproductive success. These generally include nesting strata, available prey base, and nest site disturbance.

Often raptors will concentrate their nests along a cliff and use this strata for nesting year after year. These high-use/high-density raptor nesting sites are called raptor concentration areas. Protection of these areas from surface disturbances and human activity is important, not only to maintain a stable raptor population but also to balance the predator-prey relationships that influence rodent populations. Although raptor nesting surveys have not been completed for the entire resource area, Beaver Rim and the Canyon Walls on the Lander Slope and Red Canyon are documented raptor concentration areas. The Sweetwater Rocks and Copper Mountains probably have concentrations of nesting raptors, but good surveys are lacking. Swainson's hawks and ferruginous hawks concentrate nesting activity in the Muskrat Creek/Badwater area. Accipiters prefer the Green Mountain Management Unit. However, specific concentration areas have not been identified.

By far the greatest impact on raptor production and population trends is human disturbance at the nest site during critical periods. Incubation is the most critical period. When disturbed, raptors are much more likely to desert their nest during incubation than after hatching. Once the eggs hatch, raptors exhibit a strong maternal instinct and usually will not desert their young. The second critical period is fledging. If the nest is disturbed during fledging, the young could leave the nest before they are able to fly. Consequently, the fledglings fall to the ground where they are easy prey for coyotes and other predators.

### Waterfowl and Shorebirds

Many species of waterfowl and shorebirds occur in the resource area. Their abundance varies from year to year, depending on the availability of water.



## Affected Environment

Wetland-riparian habitat provides nesting and brood-rearing areas.

The various sources of water in the resource area such as natural lakes, streams, and man-made reservoirs are important resting areas for a variety of ducks, geese and shorebirds.

In 1977, a survey of all standing waters on public land in Wyoming was completed using 1:24,000 topographic maps and color infrared aerial photographs taken between June 25, 1974, and September 30, 1976. Table 3-16 summarizes the standing water data for the Lander Resource Area. These acreages of reservoirs and lakes, plus miles of perennial streams, provide an estimate of the potential waterfowl and shorebird habitat in the resource area.

TABLE 3-16  
POTENTIAL WATERFOWL AND  
SHOREBIRD HABITAT ON  
PUBLIC LAND IN THE  
LANDER RESOURCE AREA

	Reservoirs (acres) <sup>1</sup>	Natural Lakes and Ponds <sup>1</sup>	Perennial Streams
Seasonal	526.10	920.60	233.91 (miles)
Permanent	296.60	868.70	
Unknown	294.75	95.10	

<sup>1</sup> Estimated maximum surface acreage.

Heavy grazing pressure is a problem in a majority of the riparian zones on public streams, small reservoirs and ponds throughout the resource area. This results in trampling and removal of nesting cover for waterfowl and shorebird species that nest in riparian zones. Because of heavy grazing pressure, waterfowl reproduction is considered to be well below the potential in the resource area.

Projects to protect and improve waterfowl and shorebird habitat along with habitat for a variety of other species has been limited to a small number of riparian-wetland protective fences, some goose nesting platform installations and one project involving nesting island construction. All projects constructed have included consideration for livestock watering needs. Projects currently functioning and being maintained include the following:

Ninemile Reservoir protective fence  
Lone Horse Reservoir protective fence  
Dobie Hills protective fence  
Little Durf Pit Reservoir fence  
Soda Lake protective fence  
Lost Creek Reservoir fence and Island  
Construction Project  
Little Lost Creek Reservoir protective fence  
West Fork Crooks Creek pothole blasting  
Jackson Lake Goose Nests

### Threatened or Endangered Species

Five endangered species may be present in the Lander Resource Area: the bald eagle, peregrine falcon, black-footed ferret, grizzly bear, and gray wolf (U.S. Fish and Wildlife Service letter 1984). The following sections briefly summarize the ecological requirements of these species. These species will be addressed in detail in a biological assessment being prepared in 1985 for the U.S. Fish and Wildlife Service, as required by the Endangered Species Act.

#### Black-Footed Ferret

No black-footed ferrets are known to exist in the resource area. Every year reports of ferret sightings are received at the Lander BLM office. These possible sightings are investigated by BLM or the Wyoming Game and Fish Department. Because most ferret activity is nocturnal and crepuscular, it is difficult to verify their presence. A known population of ferrets, discovered in 1981, is located about 80 miles north of the EIS area near Meeteetse, Wyoming. Black-footed ferrets have been found to be closely associated with prairie dog towns. All prairie dog towns are potential black-footed ferret habitat.

#### Peregrine Falcon

In the resource area, the peregrine is a rare migrant and no recent nesting activity has been documented. Peregrines typically nest on tall cliffs that provide sanctuary from human disturbance. Most frequently used nesting cliffs exceed 100 feet in height, and the majority are within 1 mile of a stream or river (Call 1978).

In the resource area, there are potential cliff nest sites suitable for peregrines in the North Fork Canyon of the Popo Agie River, in the Sweetwater Rocks adjacent to the Sweetwater River and in the Sweetwater Canyon. Principal food items are passerine birds, waterfowl and shorebirds.

## Affected Environment

### Bald Eagle

The 1980-81 mid-winter bald eagle survey documented 484 bald eagles wintering throughout the state. This wintering population is increasing.

Another important component of bald eagle winter habitat is perch sites. Perch sites serve as vantage points for hunting, vigilance against predators, loafing, sunning, and in some cases double as night roosts (Fisher et al. 1981). Cottonwood trees along the rivers are utilized as perch sites.

In the resource area, an estimated 15 bald eagles winter in three small areas during a typical winter. Two of these areas are located on the North Popo Agie River, and one is located on the Little Popo Agie River. Two of the three wintering areas are heavily used. The Wyopo wintering area northeast of Lander is less frequently utilized, possibly because of human disturbance in the area.

The primary source of food is carrion (Oakleaf, personal communication 1982). Fish and waterfowl are also utilized.

No historical or recent bald eagle nesting activity has been documented in the resource area.

### Grizzly Bear

Grizzly bear populations and distributions have been greatly reduced in the Western United States since the early 1900s because of loss of habitat and conflicts with man. There has been no confirmed sighting of the grizzly bear in the resource area in recent years. An old grizzly bear skull was recovered in the Red Canyon area in 1975. There have been unconfirmed reports of grizzly bear sightings in recent years along the northern edge of the Dubois Area.

Because of conflicts with man, grizzly bears have mainly survived in large remote sanctuary-type areas such as Yellowstone National Park and the Bob Marshall Wilderness Area. Grizzly bears have been known to travel considerable distances outside Yellowstone Park in search of winter killed elk and deer.

Grizzly bears use a wide variety of foods, including roots, berries and other vegetable matter. In addition, carrion, small rodents and insects are eaten.

### Gray Wolf

Like the grizzly bear, the gray wolf has been extirpated from most of its historical range. Today the gray wolf occurs in remote wooded areas away from human activity.

Sightings and scats reported in the Grass Creek Resource Area in the last 8 to 10 years indicated that a remnant population of wolves might still exist in Wyoming. It is possible, though improbable, that a wolf could occasionally be found on part of this resource area.

### Furbearers, Predators and Trophy Game Animals

Several wildlife species fall under the category of furbearers, predators or trophy game. Some of these species such as the beaver are economically important to Wyoming. Others are hunted as trophies such as mountain lions and black bears.

#### Beaver

Beaver are found in most perennial streams throughout the Lander Resource Area. They are usually common in streams where willows and aspen are plentiful.

Major beaver-habitat areas are associated with streams of the South Pass Area, including the many small streams of the upper Sweetwater, Beaver Creek and Twin Creek drainages; streams of the Lander Slope, including the upper Popo Agie drainages; and streams of the Green Mountain area. Beaver habitat is very limited on public lands in the Copper Mountain-Badwater country, in the Dubois area, and in most of the central Wind River Basin and Natrona County portion of the resource area. Most of the beaver habitat remaining in these latter portions of the resource area have deteriorated. This can be attributed primarily to the naturally more limited areas suitable for production of beaver habitat and historically excessive use of these areas by livestock.

#### Black Bear

Wyoming has both a spring and fall hunting season for bears. During the 1983 hunting season, 178 black bears were harvested in Wyoming. In

the Lander Hunt Area, 9 bears were killed by hunters in 1983. On public lands in the resource area, black bears are found in the Dubois area and the Lander Slope, Red Canyon, South Pass, and Green Mountain areas. Occasionally, they are seen in less desirable habitat areas.

### Mountain Lion

Mountain lion habitat is essentially that of their prey—mule deer. In Wyoming, mountain lions prefer conifer woodlands and juniper, mountain shrub and rockland habitat types. In recent years, mountain lions have been reported in the Green Mountains, Muddy Gap, Sweetwater Rocks, Rattlesnake Mountains, Copper Mountains, Lander Slope, and Dubois areas of the resource area.

## FOREST MANAGEMENT

### Introduction

The Green Mountain, Lander Slope, South Pass, Red Canyon, Dubois, Whiskey Mountain, and East Fork management units have potential commercial timber resources within their boundaries. But the only units that would be significantly affected by various resource management actions would be Green Mountain, Lander Slope, South Pass, and Dubois. Red Canyon has small amounts of timber stands, which are isolated because of access problems associated with private lands. These problems are not worth trying to solve because of the small amount of timber involved.

The Dubois Management Unit contains the largest amounts of timber in the Dubois area, mainly near Hat Butte and Sand Butte (500 to 600 acres); however there are access and topographic problems associated with potential harvesting.

The Whiskey Mountain and East Fork management units contain small amounts of timber that are isolated because of access and topographical problems, which reduce the harvest potential. These two areas are also crucial wildlife wintering areas that are managed by BLM and other federal and state agencies.

The following forestry resources would be significantly affected by one or more of the proposed management actions: timber quantities, sustained yield, timber condition, timber demand, access, logging and regeneration, and fire. No other resources would be significantly affected.

### Timber Quantities

#### Green Mountain Management Unit

The Green Mountain area includes the timbered areas of Crooks Mountain and Whiskey Peak and adjacent areas. The majority of the harvesting in the Lander Resource Area over the last several years has taken place here. The area contains mainly lodgepole pine, with small amounts of spruce, limber pine and aspen. Lodgepole pine is the main commercial species in the area.

Before harvesting began in about 1960, there were between 6,000 and 7,000 acres of sawtimber on the area. In that first cutting, about 175 acres of sawtimber were clearcut. Since then, about 800 additional acres have been harvested. The commercial timber lands also include approximately 5,300 acres of pole-sized timber (3 to 8 inches in diameter), 300 acres of seedling and sapling stands (up to 1 inch in diameter) and 35 acres of Engelmann spruce.

In 1976, a U.S. Forest Service type Stage II intensive forest inventory was completed on Green Mountain. Table 3-17 shows the total acreage and volumes determined by this inventory. The cubic foot volumes in this table, for each type, are in trees greater than 5 inches and less than 9 inches in diameter (DBH), and the board foot volumes are in trees greater than 9 inches in diameter.

Table 3-17 shows the acres and volumes for the different types of timber harvest. There are many acres of aspen in the area, mainly in small, scattered blocks along the fringes of conifer stands. Because they have not been harvested or burned recently, many of these trees are not perpetuating themselves and the conifers are generally taking over.

Much of the limber pine on the mountain has been killed by the mountain pine beetle. In the Willow Creek drainage, there are several relatively large, dead stands of pine. Because this species does not regenerate rapidly, some of the stands in the wetter areas may be taken over by aspen and/or lodgepole pine.

The Engelmann spruce occurs only in one drainage, the East Cottonwood Creek drainage (section 3, T.27N., R.91W.; and section 34, T.28N., R.91W.), which runs through the Cottonwood Campground. These trees occur immediately adjacent to the stream bottom. Dissemination of seed and regeneration of the spruce is very slow adjacent to the stream bottom.

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**TABLE 3-17**  
**ACREAGE AND VOLUME**

Types	Original Acres	Volume Per Acre (MBF)	Original Volume (MBF)	Acres Cut or Burned	Present Acres	Present Volume (MBF)
LP9W <sup>1</sup>	740	9.28	6,867	278	462	4,287
LP9M <sup>2</sup>	2,025	6.52	13,203	22	2,003	13,060
LP9P <sup>3</sup>	2,272	4.80	10,451	290	1,982	9,117
<b>Subtotal Sawtimber</b>	<b>5,037</b>	<b>6.80<sup>7</sup></b>	<b>30,521</b>	<b>590</b>	<b>4,447</b>	<b>26,426</b>
LP8W <sup>4</sup>	1,804	2.60	4,672	190	1,607	4,162
LP8M <sup>5</sup>	1,594	2.80	4,430	320	1,274	3,541
LP8P <sup>6</sup>	1,904	1.30	2,426	129	1,775	2,261
<b>Subtotal Pole Timber</b>	<b>5,302</b>	<b>2.30<sup>7</sup></b>	<b>11,528</b>	<b>646</b>	<b>4,656</b>	<b>9,964</b>

<sup>1</sup> LP9W = Lodgepole pine - sawtimber - well stocked.

<sup>2</sup> LP9M = Lodgepole pine - sawtimber - medium stocked.

<sup>3</sup> LP9P = Lodgepole pine - sawtimber - poorly stocked.

<sup>4</sup> LP8W = Lodgepole pine - pole timber - well stocked.

<sup>5</sup> LP8M = Lodgepole pine - pole timber - medium stocked.

<sup>6</sup> LP8P = Lodgepole pine - pole timber - poorly stocked.

<sup>7</sup> Average volume per acre.

### Lander Slope Management Unit

Commercial forest acreage is 4,675, and volume is 43,000 MBF for this unit.

The timber west of Suicide Point is mostly lodgepole pine, with several smaller stands of fir along the drainages on the eastern edge of the unit. Most of the conifer stands are fringed with aspen trees.

### South Pass Management Unit

There are approximately 1,535 acres of commercial timber land in the South Pass area. Approximately 900 acres of this timber land were included in a cooperative sale in 1976 in which timber bigger than 8 inches in diameter was harvested. This amounted to a virtual clearcut in most areas; however, they have all regenerated to lodgepole pine or aspen. The remainder of these acres are along Beaver Creek, adjacent to private lands. The majority of the timber is lodgepole pine, with one narrow strip of Douglas fir trees. This varies from one to two Douglas fir trees per acre to 10 to 20 trees per acre. Some of these Douglas fir trees are 30 to 40 inches in diameter and 60 to 70 feet tall. The standing volume of Douglas fir is estimated to be 75 to 100 MBF.

There are many stands of aspen in the area, most of it occurs in small clumps along drainages or adjacent to pine stands. Parts of some of these pine stands were removed during logging operations in 1976 to 1980 and have regenerated to aspen. In some of the areas, the aspen have partially replaced the pines. In some cases, this has proven to be a benefit to the wildlife habitat in the area (see wildlife section). Most of the aspen stands appear to be young and vigorous enough to regenerate themselves with the right type of management.

### Dubois Area Management Unit

The commercial forest acreage is 1,960 acres with an estimated total volume of 14,739 MBF, based on the 1979 Stage II intensive inventory. The scattered timbered areas are located in the Sand Butte, Ramshorn Basin, and Warm Spring Canyon areas.

### Sand Butte

The Sand Butte Compartment has the most timber land in one contiguous unit (1,440 acres) and one of the highest average volumes per acre of all the compartments (1,672 cubic feet/acre to 7,524 board feet/acre). These stands contain



## Affected Environment

mature and overmature lodgepole pine, Douglas fir, subalpine fir, and Engelmann spruce. Most of the larger lodgepole pine trees are dead or dying, because of old age and diseases.

### Ramshorn Basin

This compartment contains 280 acres of timber land, with an average volume of 10,319 board feet per acre. These stands also contain all four species mentioned in the Sand Butte area, plus large amounts of aspen. Many of these stands were clearcut in the early 1960s and are composed of regeneration up to 8 to 10 feet tall. The uncut stands cover small acreages and are composed of large, mature and overmature timber.

Approximately 50 acres in this unit have been clearcut and 50 acres have been partially cut.

### Warm Spring Canyon

This unit contains about 240 acres of mature and overmature Douglas fir stands. These stands have an average of 7,907 board foot/acre, one of the heaviest volumes of any of the compartments.

This area contains part of the flume system that was used to carry ties to the river during the tiehack days in Dubois (see the Cultural Resources section for more details).

## Sustained Yield

### Green Mountain Management Unit

The analysis of the 1976 forest inventory of Green Mountain shows the total volume in all types of stands to be approximately 100 MMBF. Using these figures and disregarding the possibility of intensive management to increase growth and timber production, the mountain should sustain an annual cut of approximately 1 MMBF, using a rotation age of 100 years. This is the standard rotation used most often with lodgepole pine in this area.

Many authorities recommend a rotation age of not more than 80 years in lodgepole pine in order to reduce the possibilities of a beetle epidemic. However, if contiguous blocks of mature timber are somewhat isolated from each other, the chance of a beetle epidemic can be greatly reduced.

The present demand from logging contractors and woodcutters on Green Mountain is about 2.0 to 2.2 million board feet. The cut on the mountain could easily be accelerated for the next 10 to 20 years from the 1 MMBF to the 2.2 MMBF needed to meet the present demand. This would salvage the beetle-killed timber and greatly reduce the potential fuel on the area.

This 2.2 MMBF is very close to the figure recommended in the computer allowable cut calculations, using the "Resource Area Control" solution that was recommended by the district and Wyoming State Office staffs.

The reason for the difference in allowable cut figures (1.0 MMBF vs 2.2 MMBF) is that the Resource Area Control solution was based on acreages and volumes for the entire district and the 1.0 MMBF figure was based on the inventory of Green Mountain itself. The 2.2 MMBF figure was based on a recommendation to shift the majority of the harvesting in the district to Green Mountain for the first 20 years of the rotation in order to salvage a large portion of the beetle-killed timber.

The present allowable cut of 750 thousand board feet (MBF) per year is based on a previous management decision to develop a timber products program to supply 750 MBF of multiple timber products annually. This decision was based on an allowable cut calculation using data from the 1976 inventory of Green Mountain. This figure has been exceeded for about the last 3 to 5 years because of the large demand for fuelwood. This demand coincided with the start of the beetle epidemic on the mountain. The expectation was to offer 750 MBF annually of live timber for the sawlog market (regulated volume), and approximately 625 MBF annually of unregulated volume.

When the large public demand for fuelwood started, it outstripped the projected demand. Therefore, for the last 3 to 5 years, approximately 1.5 to 2.5 MMBF have been harvested each year.

Figure 3-5 illustrates the level of the allowable cut for regulated and nonregulated volume and the actual harvest. The total of nonregulated volume for the 10-year period is 6,250 MBF. The yearly totals fluctuate. The yearly totals of regulated volume fluctuate greatly, because of market conditions, but the total for the decade is about 6,900 MBF, close to the 7,500 MBF allowable harvest for that period.

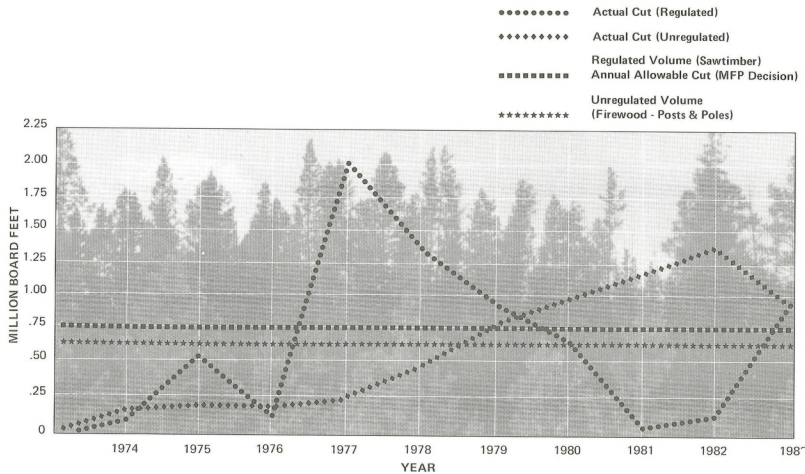


Figure 3-5  
Allowable Cut

## Affected Environment

### Lander Slope and South Pass Management Units

The timbered lands in these two areas are included in the acreage base for calculation of the district's sustained yield figure. However, no management has been taking place on the Lander Slope, and the majority of the harvestable timber is depleted at South Pass. No individual sustained yield figures for these areas have been calculated.

### Dubois Area Management Unit

This entire area is included as part of the total district sustained yield allowable cut. Using the figures from the inventory, the total area could roughly sustain an annual cut of 200 MBF.

### Timber Condition

#### Green Mountain Management Unit

The type of timber stands and the condition of the entire forested area of Green Mountain varies. Most of the sawtimber size trees on the top of Green Mountain are over 200 years old, which is about 100 years beyond the recommended rotation age for lodgepole pine. The pole stands are 60 to 100 years old and are stagnated because of the crowded growing conditions, which makes them vulnerable to attack from beetles.

There are very few areas of pure sawlog sized trees. This is due to a number of factors. In some areas, the timber was logged in a partial cutting system that removed only the biggest and best trees. This was completed 40 to 50 years ago, and the residual trees have grown and created a new stand. In some areas, fire burned through in random patterns, creating stagnated pole stands.

The dwarf mistletoe and general old age of the trees have broken down stands in large areas, which has left many dead, standing trees with profuse regeneration underneath. The regeneration in these areas was heavily infested with dwarf mistletoe from the larger trees before they died. Many of these stands of regeneration (4 to 15 feet in height) are so heavily infested that they will not grow after a precommercial thinning.

Most of the pole stands are 60 to 100 years old. They originally regenerated so heavily that they have stagnated. Some of the individual trees are growing slowly, but the large amount of suppressed trees, which are dying, offset the growth; therefore, the stand will show a net average growth of near zero.

A previous management decision to replace the mistletoe-infested, stagnated, overstocked pole-timber stands on the estimated 1,200 acres on the area with young, vigorous stands in 50 years refers to these types of stands. As a result, about 20 acres have been clearcut and have regenerated to healthy seedlings. This type of operation is mainly dependent on market demand, and will be undertaken as demand permits.

BLM receives funding from the Pest Control Division of the U.S. Forest Service to try and manage the mistletoe and insect problems on Green Mountain. These stands have no, or very few, products that can be sold. The objective has been to contract for the destruction of the present stand and provide for regeneration on the area. The stands identified for precommercial thinning projects are mainly the regenerated areas that were clearcut in 1959 through 1962. These stands include trees 1 to 3 inches in diameter and 8 to 15 feet in height. They have been thinned to a spacing of approximately 8 by 8 feet, leaving a total of about 680 trees per acre. Trees infested with mistletoe were also removed in these thinnings.

The different types of stands (sawlogs, poles, seedlings, saplings, etc.) are scattered randomly over the entire forested area and are beetle infested.

The majority of tree mortality as a result of the beetle has occurred in the last 10 years. The first small infestation was sighted on Whiskey Ridge and Whiskey Peak in 1974. Within 2 years, the infestation had spread to stands on the whole timbered area. The infestation was held to a minimum by very harsh winters, until 1980. In 1979 through 1980, the winter was very mild, and by the summer, the infestation had become an epidemic.

The present mountain pine beetle infestation on Green Mountain has killed approximately 80 to 90 percent of the trees 8 inches in diameter and larger. This has set the timber production of the mountain back several years.

## Affected Environment

The beetle's population buildup is dependent on the available food source, which is a function of the phloem (inner bark) thickness of the trees in a stand. This phloem thickness is dependent on the age and diameter of the trees. In order for the beetles to reach large populations, they need a stand of trees with an average diameter of at least 8 inches at 4.5 feet above the ground.

The mountain pine beetle is always present in lodgepole forests, to some extent, but it only builds to epidemic proportions under the right conditions. This beetle epidemic was the result of many variables, including the overall resistance of the trees, which could be a result of the advanced age of the trees; weakening of the trees by mistletoe; or possible areas of physical tree damage. However, the main factor is the large average diameter of the trees over the entire area. Because of the condition of the timber, a beetle epidemic could have occurred anytime in the last 50 to 75 years; therefore, the right combination of factors or a particular event must have triggered the epidemic at this time.

The beetles usually have a 1-year life cycle. The adult beetles emerge from a dead tree in August or early September and fly to another tree. The beetle attack and subsequent boring into the tree for reproduction causes a disruption in the water and nutrient flow up and down the stem, which eventually kills the tree.

A blue stain fungus is also introduced by the beetle as it bores into the tree. This fungus grows quickly in the tissues of the tree and plugs up its water conduction system, which aids in killing the tree.

Once the epidemic has started, and the beetles have killed most of the larger-sized trees, they will usually go into smaller trees (down to about 5 inches in diameter), if they are available. They cannot produce enough offspring to sustain the epidemic populations in these small trees, but they can do a large amount of damage.

The size of the beetle population is governed by the health of the stands. When the resistance of the timber is kept high, through management and fire, the beetles stay below epidemic proportions.

If a drought or other disturbance occurs, the resistance of the stand is lowered and the beetle population may get out of control. An epidemic can occur that may last until the host trees are depleted. The beetle population will then return to an endemic state (Berryman 1978, 1980).

A beetle control plan was designed to alleviate the epidemic situation; however, harvesting was limited to the market demand, and the epidemic

spread over the entire mountain before enough trees could be harvested to prevent a beetle epidemic.

### Lander Slope Management Unit

This area is not a good quality site for Douglas fir, but scattered stands of fir exist along the drainage that are relatively young and healthy. Some of these stands were partially cut about 50 to 60 years ago, and a residual stand grew up from the uncut trees. These fir stands do not contain exceptionally good quality trees in relation to other Douglas fir stands in the vicinity. The trees are not tall (50 to 70 feet) and have excessive limbs.

The large block of lodgepole pine in the Suicide Point area (over 4,000 acres) is in relatively poor condition. This area was partially cut years ago, and only the biggest and best timber was removed. The present stand is the original residual stand that grew after logging. Some of these trees form a good stand of timber, but the remainder is crooked, has excessive limbs and is full of mistletoe. Because of the large amounts of dwarf mistletoe in these pine stands, regeneration has become infested as well.

The 1977 intensive inventory showed an average of 383 live, mistletoe-infested trees per acre on the total area. Most of these trees are under 9 inches in diameter.

There are also large areas of trees with pine diseases, such as western gall rust, that have sustained substantial damage. On the lower elevations of the mountain, the mountain pine beetle has been working around the edges of these stands, but they have not reached epidemic proportions. Some of this timber is above the elevational limit of the beetle where the weather is harsh and kills a large portion of the beetles. If enough of them continue to die during the winter, an epidemic population will not be able to sustain itself. Some of the timber in this unit will probably continue to be protected by this mechanism; however, the majority of the timber is at an age that could lead to an epidemic situation.

### South Pass Management Unit

Generally, the timber in this area is relatively short and contains excessive limbs. This may be the result of the location of the stands; the area is on the very fringes of tree growth. The trees grow in small valleys or drainages that collect large

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amounts of windblown snow in the winter, which melts slowly in the spring and provides moisture during a good part of the growing season. The strong wind that blows continuously and the large amounts of snowpack may be the reason for the stunted and limby characteristics of the trees. The soil in these areas is deep and well-drained and appears to be a good growing medium. There are several small areas that are protected from the wind, which grow relatively tall, straight trees.

Several of the cut areas, especially along the main Fort Stambaugh Loop Road and near Miner's Delight, have been planted with containerized seedlings, which are growing well. Some of them may have regenerated, but planting was undertaken to hasten the regeneration. Other cut areas have regenerated completely, either to pine or aspen, or both.

The quality of the timber along Beaver Creek is generally better than the timber higher on the mountain because it is protected from the wind. The timber on the lower slopes has to compete more for sunlight; therefore, it is generally taller and straighter and contains fewer limbs.

### Dubois Area Management Unit

The timber on most of the management unit is healthy, with very little disease, parasite or insect problems. Most of the timber in the Ramshorn Basin unit is 20-year old regeneration and is quite healthy. The timber in the Sand Butte area is the least healthy of the area. The lodgepole and subalpine fir are beginning to die and are being replaced by spruce, Douglas fir and some lodgepole pine regeneration. Almost all of the timber stands in the area need some type of treatment to improve the health or production capability of the stands.

### Timber Demand

#### Green Mountain Management Unit

There are several sawmills in the state that are interested in buying logs from Green Mountain, including The Louisiana Pacific sawmill in Dubois. However, Louisiana Pacific uses very little dead wood and may not be interested in Green Mountain because of the large amounts of dead timber on it. One small sawmill in Pavillion and one in Shoshone have also expressed an interest in harvesting timber on Green Mountain. There

is a sawmill in Laramie that has expressed an interest in Green Mountain; however, this mill's production has slowed because of the recent recession.

There is also a sawmill in Lander that has expressed an interest in increasing its purchase of deadwood on Green Mountain from 250 to 500 MBF to 1 MMBF per year. The Lander District of the U.S. Forest Service has given the owners of this sawmill a letter stating that they could probably provide the mill with about 1.0 MMBF per year. If they buy 1.0 MMBF from Green Mountain, this will sustain the mill at the capacity they want.

The main outlet for the houselogs from this mill is presently in Texas, and, according to the owners, it appears to be a stable market. The housing market in Texas was quite strong before the country came out of the recent recession, and from projections, will probably remain strong. There appears to be a stable demand for houselog material from Green Mountain.

There is a substantial demand for deadwood in this area. Many people from the Casper area come to Green Mountain to cut fuelwood for home consumption. In the past 3 to 4 years, between 700 and 800 permits were sold per year for fuelwood, totalling approximately 1.0 to 1.7 million board feet per year. This demand is expected to continue in the foreseeable future (see figure 3-6).

There are several commercial fuelwood cutters in the Casper area, and a few of them have expressed an interest in cutting on Green Mountain. A few small commercial sales have been sold. The market for this fuelwood from Green Mountain depends on the availability of timber from forest lands near Casper.

### Lander Slope Management Unit

The large block of timber west of Mormon Basin (Suicide Point) contains a variety of size classes, and hence, a variety of wood products. Some trespass cutting has been observed on the north edge of the North Fork Canyon.

There has been no demand for timber on the remainder of the area, mainly because of the isolation of the area and lack of access. A timber sale could create a demand. For example, Wyoming Wood Products depends on BLM timber lands on Green Mountain and U.S. Forest Service lands in the Wind River Mountains. If the area were opened to timber sales, it would be closer to Lander than Green Mountain or the South Pass



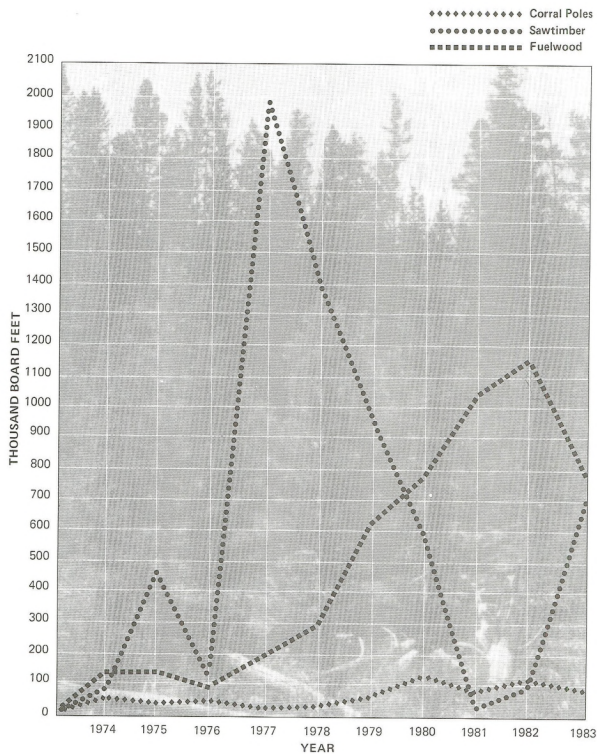


Figure 3-6  
Timber Demand

## Affected Environment

area, and the timber would be more competitive than other timber in the area. Also, a large demand for fuelwood and other minor forest products from the Lander area could be satisfied if access existed.

### South Pass Management Unit

During the South Pass Insect Control Sale, the slash piles were opened to free use fuelwood gathering, which helped clean up the waste material. Since the sale ended (1980), the area has been open to fuelwood cutting (permits required). This has resulted in the virtual elimination of dead wood on most of BLM lands, except in relatively inaccessible or hard to find areas.

Many people from Lander and Riverton are dependent on the South Pass area for their fuelwood sales, because it is the closest timbered area. However, most people cut their wood on national forest lands. About 100 to 125 permits for this area are sold by BLM each year.

About 40 to 50 Christmas tree permits are sold in this area every year. The small amount of sales is a matter of low supply, not a matter of low demand.

There are no commercial wood cutters or loggers dependent on BLM timber resources in the area. However, several of these operators are dependent on immediately adjacent U.S. Forest Service land. Several operators have inquired about the possibilities of sales in this area.

### Dubois Area Management Unit

There is little demand for fuelwood from BLM lands, mainly because the national forest has many areas with good timber and good access roads. A few people have requested permits to salvage some of the wood from the Whiskey Mountain fire. There has been some demand for poles from a local dealer.

There are a few small capacity sawmills in the Dubois area that get their timber from the national forest lands who have been interested in getting timber from this area.

Figure 3-6 shows the total volumes sold from Green Mountain, which is the major timber producing unit in the resource area. Harvested volumes from other units have been insignificant, except for the emergency sale of beetle-killed timber from South Pass in 1976.

## Access

### Green Mountain Management Unit

The Green Mountain Loop Road was constructed in 1967 and 1968, which utilized seismograph trails for most of the route. The route follows very steep terrain for much of the way (14 percent grade).

The road is closed from December 1 to June 1 when the ground is soft and needs protection. The west side of the loop road is in very poor condition. Graders have been unable to maintain it for several years, because much of the surface material has eroded away, exposing large rocks.

A decision to provide a good crushed rock surface for the Green Mountain Loop Road was an effort to improve the road by using stumpage receipts from the sale of timber on the area. The market is presently so low that there is not enough return from the timber to utilize this method. BLM maintains this road on a yearly basis; however, this is only minimum maintenance. With the volume of traffic using this road, this has not been enough, and the road has deteriorated in many places. During uranium exploration activities on the mountain (3 to 4 years ago), an attempt had been made to establish a cooperative agreement with these companies to share the maintenance responsibilities on the road. This agreement was never completed, and the road continued to deteriorate.

Many of the logging roads on the mountain that have been used for timber sales since 1974 have utilized existing roads or old seismographic trails. In 1977 through 1978, Louisiana Pacific built some additional roads for access. Wyoming Wood Products also built roads to open up previously isolated areas on the top of the mountain.

A 1980 sale southeast of Cottonwood Campground on 45 to 50 percent slopes was done as an experiment. The area was logged using conventional methods (tracked and rubber-tired skidders) to observe erosion potential on logged areas. BLM personnel established siltation monitoring stations in streams below the logged area. Observations have shown no increased sediment loads as a result of the logging. Further observation is needed to establish erosion potential from logged areas and associated roads.

BLM plans to acquire an easement on the Cooper Creek-Willow Creek roads. This easement will begin in section 22, T.28N., R.91W., at the junction of the Loop Road. It will then proceed





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east, in front of the Owl Hills, go east and south until it meets the Willow Creek Road, and then up the south side of Green Mountain.

### Lander Slope Management Unit

There is no legal access using existing roads into any of the timber stands. Some roads cross state or private lands. There are roads into most of the stands of timber along the U.S. Forest Service boundary, but they are 4-wheel drive and are in such poor condition that a commercial timber venture would not be possible.

There are several roads into the Mormon Basin-Sulicide Point timber stands, but all of them cross some private lands. The main road that has been used in the past is the Shoshone Lake Road. This is a county road to the bottom of the slope; from there, the road is on state land for about 3 miles, and on BLM land for another 3 miles until it reaches national forest lands. In 1983, the Wyoming Division of Forestry upgraded the beginning of this road, from the private land at the bottom of the slope (end of county road), to Mormon Basin at the top. If BLM sold timber in this area, the next 3 miles of existing road would have to be upgraded, because it has washed out. Several spur roads would need to be built, depending on the size and locations of timber sale blocks.

### South Pass Management Unit

The major access road to BLM lands is the Fort Stambaugh Loop Road, which starts at Highway 28 and ends near Atlantic City. Most of the timber lands are accessible from this road, or from roads leading off this road.

The Miner's Delight By-Pass Road was built recently to keep traffic out of the Miner's Delight Townsite. This north-south road connects with many roads in the area and provides access to the majority of the BLM timber stands. The road to Beaver Creek provides access to the edges of uncut stands. Most of these uncut stands are inaccessible with a vehicle. If they were logged, short spur roads would have to be built into some areas.

There is no need for an easement acquisition program in this area.

### Dubois Area Management Unit

There is no legal access to any of the BLM timber stands in the area. There is physical access to most of them on existing roads; however, the roads cross either state, private or national forest lands. The stands are so small and isolated that it would not be economically feasible to purchase easements over private lands.

If timber were sold in any of the areas, the purchaser would have to either apply for access over national forest lands, or negotiate for access across private lands.

## Logging and Regeneration

### Green Mountain Management Unit

In all older regenerated clearcuts, the trees have been precommercially thinned to transfer growth to the residual trees. During these operations, an attempt was made to clean the stand of mistletoe by removing all regeneration that was infested.

In an effort to control mistletoe, adjacent, larger trees around the edges of newly regenerated blocks would be cut. This has not been accomplished on all clearcuts. This should be done within 10 years of regeneration and the adjacent larger stand should be cut back approximately 90 feet, because seeds from mistletoe plants can travel at least 30 feet utilizing a spring-like mechanism in the seed pod. The wind can blow them farther.

A soil survey was conducted to determine why some old clearcuts have not regenerated and others have, and to determine what management criteria is best for different areas, based on soil characteristics.

The soil survey was also planned to study the feasibility of fertilizing trees to increase their growth. The soil surveys that have been completed on the mountain have not included any specific soil analysis to determine available nutrients. Since the soil quantities are not limiting, there is some potential for fertilization. More study will be necessary to determine if fertilization is economically feasible.

Previous logging has been done with conventional logging systems, except the partial

## Affected Environment

cutting or commercial thinnings in pole stands and in some fuelwood areas. This method will probably continue.

The steep forested slopes of Green Mountain are generally composed of moderately deep to very deep, medium textured soils. The major percentage of the area is occupied by a gravelly, sandy loam soil. Soil reaction is medium to slightly acidic. The forested slopes on Green Mountain are stable. If this area, with approximately 20 inches of annual precipitation were cut, increases in soil erosion rates and water yield could be expected. Proper harvest techniques, reforestation, and vegetation establishment will decrease erosion rates on site and decrease water yield.

### Lander Slope Management Unit

The only logging that has taken place in this area was about 40 to 50 years ago. This was done in the winter with horses and sleds. There is evidence that logging occurred in most of the stands on reasonably gentle terrain and on the steeper slopes below Cyclone Pass. Both Douglas fir and lodgepole pine were harvested, and only the best quality and largest trees were taken. The residual stand has grown into a new, thick stand, and the potential for logging exists again.

### South Pass Management Unit

Large scale logging in conjunction with the South Pass Insect Control Project started in 1976 on BLM lands. Some BLM lands were cut every year, along with some national forest lands, until the sale contract ended in 1981. Trees larger than 8 inches in diameter were cut by using conventional systems (i.e., tracked and rubber-tired skidders). A few small stands on BLM lands were clearcut and piled.

Recommendations were made to purchase seedlings every year to assure regeneration of all cut areas. After 3 years, however, it was discovered that all areas would regenerate naturally without supplemental plantings.

Plans for precommercial thinning were designed to assure optimum growth on all regeneration in the area by transferring growth potential onto residual trees. This was completed on all cutover areas in which the regeneration was large enough to benefit from thinning. This is an ongoing program.

There is potential for logging on about 200 acres in the South Pass area. This area has not been logged nor cut by fuelwood cutters.

### Dubois Area Management Unit

Several timbered areas in the Dubois area have been logged in the past. Most of these are in the Ramshorn Basin Unit and were logged in the early 1960s. These areas contained lodgepole pine, subalpine fir, Engelmann spruce, and Douglas fir. All of these areas have regenerated, mainly with lodgepole and subalpine fir. The regeneration is from 3 to 15 feet in height, and will need to be thinned soon to enhance the productivity of the site.

There are several areas that have the potential to support an economical timber sale, depending on demand and access.

## Fire

### Purposes of Burning Forested Rangelands

The following benefits can be derived from controlled burns in forested areas.

- Manage fuels for wildfire hazard reduction;
- Aid in controlling the life cycle of the mountain pine beetle;
- Control, or at least minimize, dwarf mistletoe;
- Kill stagnated thickets of pine reproduction;
- Kill or thin dense stands of big sagebrush;
- Prepare seedbed for pine seedling establishment;
- Increase production palatability and utilization of herbaceous forage for grazing animals;
- Improve grazing and browsing access in dense deadfall areas;
- Initiate herbaceous growth one to three weeks earlier on fresh burns;
- Release bound plant nutrients to the soil for plant use;
- Rejuvenate woody plants for browse production, especially aspen;
- Reduce needle and debris mats that inhibit grass and other desirable plants;
- Reduce temporarily the amount of litter and vegetation that intercepts precipitation from light rains;
- Reduce temporarily the consumption of water by less desirable brush and tree species;

## Affected Environment

- Improve ecological diversity and stability in plant communities; and
- Provide snags for cavity nesting and tree feeding birds.

### Green Mountain Management Unit

Historically, plant community composition, species diversity, and stand longevity in most forested rangeland ecosystems were regulated by fires. This is especially true in lodgepole pine forests where the forest matured, then died from old age, insect infestations, or windthrow, leaving highly combustible fuel for wildfires. The forest would burn and begin again as seed was released from serotinous cones.

### Lander Slope Management Unit

There have been no known wildfires of any size in this area in recent years.

The potential for prescribed burning has not been investigated completely in this area. However, there are many aspen stands that could benefit from this practice. Also, there are many acres of stagnated lodgepole pine stands, also heavily infested with mistletoe, that could benefit from a prescribed burn.

A prescribed burning policy is being prepared for this area. There appears to be some opportunities for prescribed burning that would benefit wildlife.

### South Pass Management Unit

The only recent wildfire in this area was in Meadow Gulch in 1977. This burned about 60 acres of mainly slash on recently harvested timber lands. Because the fire occurred when the slash was on the ground, the seeds were destroyed by the fire and were not able to regenerate.

There is a good potential for prescribed fire management in this area. Many aspen stands consist of large individual trees where very little regeneration is occurring. There is some limber pine in the areas that will eventually take over the stands if precautions are not taken.

There are several riparian areas that contain old stands of willow that are unhealthy. A prescribed burn in some of these areas would stimulate growth of the willow and grasses.

### Dubois Area Management Unit

Fire has played a major role in some areas in this unit. The fire of 1939 on Whiskey Mountain created a large area that became an important habitat for parts of the large bighorn sheep population in the area.

The Crooked Creek fire of 1980 regenerated a stagnated lodgepole pine stand and created a temporary increase in forage area for domestic cattle and big game animals.

There are many areas of sagebrush and many stands of aspen in the area that could potentially benefit from prescribed burning.

## RECREATION

### Introduction

The Lander Resource Area contains outstanding recreational opportunities and is a major gateway to Yellowstone and Grand Teton National parks in northwest Wyoming. The mountain scenery, world class fishing, big game hunting, and wilderness opportunities in the area attract visitors from throughout the nation. The Lander-South Pass, Dubois and Boysen Reservoir areas are destination recreational areas. The recreational industry is a major part of the area's economy.

Most of the recreational use on BLM land in the Lander Resource Area is widely dispersed. Visitors generally participate in a wide variety of recreational activities, including fishing, hunting, camping, picnicking, hiking, sight-seeing, swimming, boating, horseback riding, nature observation, rock collecting, cross-country skiing, snowshoeing, hang gliding, jogging, bicycling, motocycling, four-wheel driving, and snowmobiling. Table 3-18 shows the estimated annual recreational visits on public land in the Lander Resource Area.

There are 11 recreation management areas (RMAs) in the Lander Resource Area. Some of these areas correspond to resource management units, as shown on map 3-27.

Recreation management areas are areas with significant recreational resource opportunities and values. RMAs account for a large amount of the recreational use and activities that occur in



#### Type S Recreation Management Areas

- A Continental Divide
- B Oregon-Mormon Pioneer National Historic Trail
- C South Pass Historic Mining Area

#### Type E Recreation Management Areas

- D Castle Gardens
- E Whiskey Mountain/East Fork
- F Green Mountain
- G Lander Slope/Red Canyon
- H Dubois Badlands
- I Sweetwater Canyon
- J Sweetwater Rocks

Other Extensive Management Areas  
(Labeled on map face)

\*Proposed Withdrawal Area

Map 3-27  
Recreation Management Areas  
Lander Resource Area

## Affected Environment

**TABLE 3-18**  
**RECREATIONAL USE IN THE**  
**LANDER RESOURCE AREA FOR 1983<sup>1</sup>**

Type of Use	Developed Sites	Undeveloped Sites	Total <sup>2</sup>
Winter sports	—	9,500	9,500
Water sports	—	—	—
Fishing	—	1,570	1,570
Camping	22,841 <sup>3</sup>	39,156 <sup>4</sup>	61,997
Hunting <sup>5</sup>	—	126,379	126,379
Picnicking <sup>6</sup>	—	166,671	166,671

<sup>1</sup> BLM administered land only.

<sup>2</sup> Visitor days (12 hours).

<sup>3</sup> Big Atlantic Gulch, Atlantic City, and Cottonwood campgrounds average daily use times 120 days. (Includes picnicking and camping.)

<sup>4</sup> Based on statewide developed/undeveloped site ratio (7:12).

<sup>5</sup> Based on Wyoming Game and Fish data.

<sup>6</sup> Based on statewide total camping/picnicking ratio (2.15:5.78).

the resource area (see table 3-19). Special recreation management areas require explicit on-the-ground management. Minimal management is frequently sufficient in extensive recreation management areas.

Only RMAs within the respective management units have been covered. Other extensive RMAs that do not have significant recreational resource conflicts will not be discussed further in the analysis.

This analysis focuses on recreational resource opportunities that would be significantly impacted by management actions: These activities include big game hunting, fishing, camping, sight-seeing, scenery, cultural resources, and recreational access. It does not address those recreational resource opportunities that would not be significantly impacted.

### Big Game Hunting

Hunting is the most significant recreational activity in the resource area. The species hunted include antelope, mule deer, elk, moose, and bighorn sheep. Although hunting use occurs on most lands in the planning area, it is only significant enough to warrant management action in the Whiskey Mountain, East Fork, Red Canyon/

Lander Slope, and Green Mountain management areas, because they consistently produce excellent hunting opportunities. The largest concentration of Rocky Mountain bighorn sheep in the continental United States spend their winters on Whiskey Mountain. East Fork big game winter range supports the largest natural foraging elk herd in Wyoming. Red Canyon/Lander Slope is crucial winter range for mule deer, elk and bighorn sheep. There are problems or conflicts between hunters and private landowners in the Lander Slope area. Green Mountain consistently produces excellent hunting for deer and elk.

There is considerable support from sportsman groups in the region for any measures that would increase or enhance the hunting opportunities available in these areas.

Hunter-day information for these areas is shown on table 3-20. This information corresponds with Wyoming Game and Fish hunt areas and the percentage of winter range support provided by these management areas for big game populations (WGFD 1983).

### Fishing

Some excellent fishing opportunities exist for brook, brown and rainbow trout in several streams and reservoirs. Significant fishing opportunities exist in the South Pass, Beaver Creek, Green Mountain, and Dubois management areas. The top-ranked fishing opportunities in these areas include:

#### Streams

Sweetwater River  
Wind River  
Big Atlantic Gulch  
Willow Creek (South Pass)  
Baldwin Creek  
East Fork Wind River  
Little Popo Agie  
Willow Creek (Green Mountain)  
Big and Little Hermit Gulch  
East and Middle Cottonwood (Green Mountain)

#### Reservoirs

Antelope Springs  
Snyder Creek  
Silver Creek



## Affected Environment

**TABLE 3-19**  
**ESTIMATED VISITOR USE**  
**ON BLM ADMINISTERED PUBLIC LANDS**

Recreation Management Areas	Type	1983 Estimated Visits and Visitor Days <sup>1</sup>	Approximate Acreage <sup>2</sup>	Primary Recreation Activities <sup>3</sup>
Continental Divide National Scenic Trail	Special	150 visits/ 30 days	13,400	S, M, H, HB, SM
Oregon/Mormon Pioneer National Historic Trail	Special	45,100 visits/ 5,020 days	23,040	T, H, HI, P, SM, X
South Pass Historic Mining Area	Special	62,600 visits/ 22,200 days	15,000	HU, CA, S, F, SM, X
Castle Gardens	Special	2,500 visits/ 500 days	80	P, S
Whiskey Mountain/East Fork	Special	3,636 visits/ 303 days	2,000	HU, W, CA, SM
Green Mountain	Special	53,100 visits/ 7,400 days	55,890	CA, HU, P, S, F, SM, X
Lander Slope/Red Canyon	Special	83,600 visits/ 10,900 days	40,090	SM, X
Dubois Badlands	Special	3,300 visits/ 750 days	4,520	S, HU, HR, ORV
Sweetwater Canyon	Special	1,150 visits/ 295 days	9,056	CA, HU, H, HI, F/C, SM, X
Sweetwater Rocks	Special	3,500 visits/ 1,100 days	32,575	R, CA, HU, H, O
Other Extensive <sup>4</sup> :	General	24,000 visits/ 2,000 days	1,120	HU, ORV
<b>Totals</b>		<b>282,636 visits/ 50,498 days</b>		

<sup>1</sup> Compilation of land, water and snow-based recreation uses.

<sup>2</sup> Public lands only - does not include other ownership in the management area.

<sup>3</sup> Recreation Activities:

S - sightseeing	X - cross-country skiing	O - outdoor education
M - motor touring	HU - hunting	W - wildlife
H - hiking	F - fishing	HR - horse racing
HB - horseback riding	C - canoeing	ORV - off-road vehicles
SM - snowmobiling	CA - camping	T - trail re-enactment
T - picnicking	HI - historic trail	R - rock climbing
	treks/sightseeing	

<sup>4</sup> Includes Warm Springs Canyon, Beaver Rim, Government Draw, Lysite Badlands, and Copper Mountain



## Affected Environment

**TABLE 3-20**  
**HUNTER DAYS**

Management Area	Species	Percent Winter Range Support	Hunter <sup>1</sup> Days
Whiskey Mountain	Bighorn Sheep	100.0	782
	Elk	44.0	2,666
	Mule Deer	1.0	34
	Moose	3.0	4
<b>Total</b>			<b>3,486</b>
East Fork	Elk	70.0	9,588
	Mule Deer	7.2	245
	Antelope	50.0	66
	Bighorn Sheep	100.0	18
	Moose	5.3	7
<b>Total</b>			<b>9,921</b>
Red Canyon/ Lander Slope	Elk	100.0	6,021
	Mule Deer	100.0	1,020
	Antelope	10.0	88
	Bighorn Sheep	100.0	157
	Moose	50.0	50
<b>Total</b>			<b>7,336</b>
Green Mountain	Elk	100.0	1,066
	Mule Deer	80.0	1,904
	Antelope	25.0	848
<b>Total</b>			<b>3,818</b>

<sup>1</sup> Hunter Days = Total number of days hunted divided by the number of hunters.

The public lands provide approximately 5 percent of the fishing opportunities in the entire area. Even though overall use is comparatively low, fishing opportunities on public land are significant because they are unique, high-quality fisheries and are more accessible and provide winter and early summer fishing.

### Camping

Much of the camping use occurs in combination with hunting and fishing. Generally, camping is dispersed over the entire resource area. Developed camping and picnicking opportunities are located in the Green Mountain and South Pass management units (see map 3-28).

There has been increased use of riparian areas for undeveloped camping, especially along the banks of the Sweetwater River, upstream from

Sweetwater Station. Easily accessible areas such as BLM (Phelps Dodge) Bridge are being used heavily as fishing camps.

Concentrations of livestock along the banks of fishing areas conflict with recreational users and vice versa.

A self-pay fee permit system was initiated for the South Pass and Green Mountain campgrounds in 1983. The overnight camping fee is based on rates charged for similar non-BLM facilities. The 1983 fee of \$3.00 per unit brought in almost \$3,000 for the 1983 season. (This almost equaled maintenance costs.) The fee system has been well received by the users and has helped resolve a long-time problem of homestead camping.

Lodgepole pine in the South Pass and Green Mountain areas are infested with the mountain pine beetle, which has caused deterioration in the timbered areas. The infestation has reached epidemic proportions, threatening the scenic beauty of the campgrounds. Commandra blister rust and dwarf mistletoe also occur in the trees and are decreasing their vigor and increasing fire danger.

A tree-spade transplant of 3 to 5 foot native stock lodgepole at Big Atlantic Gulch campground in the fall of 1983 was very successful (see Forestry for South Pass and Green Mountain management areas).

Abandoned mineral exploration roads, mine shafts and adits pose a hazard to users in the Green Mountain and South Pass Historic Mining areas.

### Sight-seeing

There is a wide variety of scenery in the Lander Resource Area. All recreational management areas contain Class A quality resources.

The resource area has three classes of scenic quality: Class A, high-scenic values; Class B, moderate-scenic values and; Class C, low-scenic values. Scenic quality is the degree of harmony, contrast and variety within a landscape.

The resource area contains wide-open spaces, with significant areas of predominately unmodified natural environment. A low concentration of users in most areas and few user controls or restrictions are important recreational resource values or opportunities to most people.



-  Campground
-  Picnic Site
-  Interpretive Site

Map 3-28  
Developed Recreation Areas  
Lander Resource Area

## Affected Environment

Viewing and enjoying wildlife and natural and cultural resources is a significant recreational resource. The significant areas in the Lander Resource Area include:

### Whiskey Mountain

An estimated 25,000 people (1980 WGFD) visit this area to see the Rocky Mountain Bighorn sheep on their winter range. These sheep are of national significance. This area shares a common boundary with the Fitzpatrick Wilderness Area managed by the U.S. Forest Service. A portion of the area includes 487 acres under interim wilderness management. There is concern for ORV damage to the winter range habitat in this area.

### Red Canyon

This area contains approximately 500 head of elk during the winter. It also contains the Red Canyon National Natural Landmark, a geologic landmark that requires special management for protection of its natural values. The 1982 average daily traffic count along the Red Canyon overlook was 1,180 vehicles per day (Warburton 1982).

### Dubois Badlands

The Dubois Badlands, a 4,500-acre unit east of Dubois, was formerly a wilderness study area but was dropped because of its small size. This unit contains unique geology, with its colorful banding and unusual landforms; a herd of bighorn sheep; and a winter range for elk. The primary concern for this unit is ORV use.

The badlands area is a possible candidate of Outstanding Natural Area Designation and Management. The area presently has no ORV management.

### Warm Spring Canyon

Two natural limestone arches and a spring occur within the canyon. Warm Springs Creek is also an excellent trout fishery, and the steep canyon walls provide nesting sites for raptors. A flume, built in 1928, was used for transporting timber for hand-hewn railroad ties.

### Beaver Rim

Beaver Rim is an 1,100-acre unit about 25 miles northeast of South Pass. The area can be easily viewed from Highway 287. It is prime raptor habitat, with nesting occurring on the high rocky ledges of the rim. Recently, the area has been used for launching hang gliders.

### Castle Gardens

Castle Gardens is an area with beauty and cultural interest. It is a well known area and is widely publicized. The recreational use in Castle Gardens is destination oriented. It is an isolated phenomenon in a sea of sagebrush. There are no other recreational attractions in this area, resulting in low numbers of extended day use in the area (see Cultural Resources for a further discussion of Castle Gardens).

The future level of recreational development at Castle Gardens will be minimal, although additional interpretative information could be provided. BLM's primary objective is to maintain the natural character and beauty of the area. The low level of use does not warrant additional facilities. It may be necessary to harden foot paths in places to minimize erosion, but trails should remain primitive, with minimal disturbance and use of natural looking materials. There are plans to replace log parking barriers with native rock.

The area is very sensitive to off-road vehicle use because of highly erosive soils and sandstones and is easily scarred. A closure to ORV use outside the main access road should be made on the withdrawal area.

### South Pass Historic Mining Area

The recreational/cultural values in this area are significant. The natural setting is complimented by the historical sites. BLM's interest in this is based on the state's efforts to preserve the historical values at South Pass City. In 1968, BLM developed a plan to develop recreational values on the public lands in the area. Funding was available in the early 1970s and BLM built two campgrounds, constructed the Fort Stambaugh Loop Road, and put up fencing around hazardous and abandoned mine shafts and structures. BLM also did some stabilization work on a few of the mine buildings, particularly at the Old Miner's Delight Townsite.

## Affected Environment

### Oregon/Mormon Pioneer National Historic Trail

There has been increased use, interest and awareness of the trail recently. Legislation is also pending for adding the California Emigrant and Pony Express trails to the existing trail corridor.

Since the 1976 Bicentennial Wagon Train Reenactment, trail use has steadily increased. Most use has been from universities, schools, historical interest groups, scouts, or church outings. Applications for special recreational use permits are being filed for commercial and educational use of the trail. Special area permits will be required for groups of 10 people and 5 or more passenger vehicles. There is an increasing interest in individual use of the trail. Most recreational uses are for trail reenactment, using foot travel, horses, and wagons or handcarts; however, support vehicles are often used. Some groups have used motorcycles.

The Devil's Gate and Split Rock interpretive sites receive very high use. There are from 50 to 100 vehicles per day at Split Rock and from 30 to 40 vehicles per day at Devil's Gate during the summer tourist season. The view of the Sweetwater Valley from these interpretive sites is critical to the purpose of these developments.

### Access

Inadequate ORV management has resulted in a large number of roads and trails across the country. ORV access is needed and is necessary for use and recreational enjoyment of the public lands; however, proper management of access must consider other recreational resource values, including the aesthetic, natural, wildlife, etc. Each mile of road or trail affects approximately 2 acres of land. Based on the number of roads on the range lands, roads remove a sizeable acreage of forage production from wildlife and livestock use, which also affects the hunting opportunities and experience. Management of off-road vehicles must address the need, location and problems of motorized travel on the public lands. Road and watershed resource damage is a problem in almost all areas during inclement conditions and high-soil moisture.

Priority areas for ORV management are:

- Lander Slope - Red Canyon area
- Green Mountain
- Whiskey Mountain

Other Areas: South Pass Historic Mining area, Sheep Mountain, Beaver Rim, Sweetwater Canyon, Castle Gardens, Dubois Badlands and Government Draw.

Legal access is an issue in the following areas:

- Lander Slope - Red Canyon area
- Beaver Creek
- Sweetwater Rocks
- Copper Mountains
- Dubois area

Other isolated areas, including mixed landownership.

Access to public land in these areas could be or is being restricted by private landowners. Access recommendations for the recreation program are integrated with the transportation plan.

### Recreation Opportunity Spectrum (ROS)

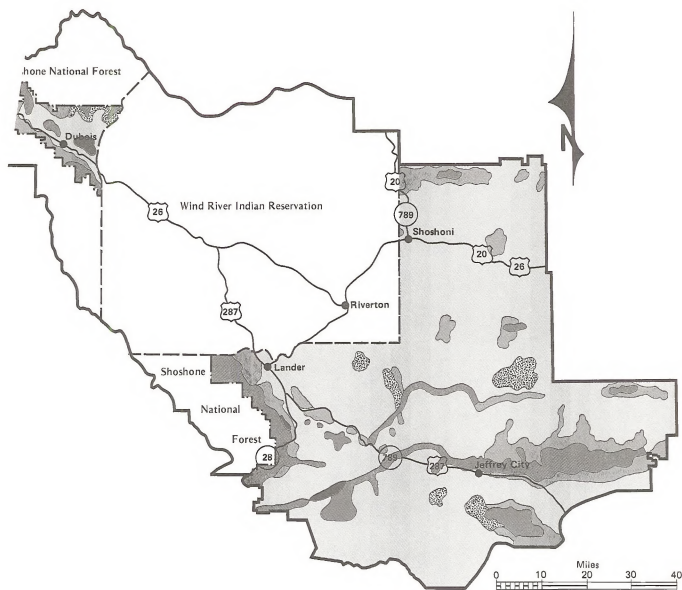
Public lands are managed to provide a broad spectrum of recreational opportunities in the Lander Resource Area. BLM's management objective is to provide a range of opportunities for recreational experiences now and in the future (see map 3-30 for designation of ROS classes in the Lander area).

The ROS is divided into six classes: primitive, semi-primitive/nonmotorized, semi-primitive/motorized, roaded natural, rural, and urban. The spectrum has a combination and mix of activities, settings, and probable experience opportunities. The ROS provides a framework for stratifying and defining classes of outdoor recreational opportunity environments. Its use on the public lands will facilitate the consideration, determination and implementation of the recreation management role.

### Visual Resources

A wide variety of scenery exists in the resource area (see map 3-29). The Visual Resource Management (VRM) goal is to minimize adverse impacts to the land, while maintaining the effectiveness of land-use allocations. It is a positive program that makes a project look better through mitigative impacts.

The objective is to make a project less obtrusive, more inconspicuous, and in better harmony, by using three techniques:

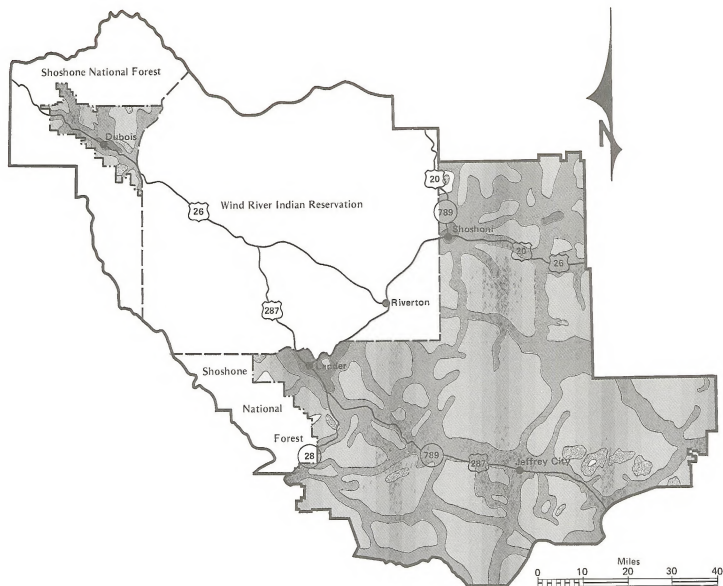


- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

See VRM Class Definitions

Note: The Oregon-Mormon Pioneer National Historic Trail is managed as Class 1 and Class 2 VRM.

Map 3-29  
Visual Resource Management  
Lander Resource Area



- Primitive
- Semi-Primitive Non-motorized
- Semi-Primitive Motorized
- Roaded Natural
- Rural
- Urban

Map 3-30  
Recreation Opportunity Spectrum (ROS)  
Lander Resource Area



## Affected Environment

1. Careful location.
2. Minimized disturbance.
3. Repetition of elements of line, form, color, and texture. The sagebrush color that best blends in with 90 percent of the landscape in the Lander Resource Area is Standard Environmental Color Carlsbad Canyon - Munsell Color No. 2.5Y 6/2.

Map 3-31 shows the scenery quality classes for the resource area.

Visual resources will continue to be evaluated in all planning projects. This evaluation will consider the significance of the proposed project and the visual sensitivity of the affected area. Stipulations will be attached as appropriate to assure compatibility of projects with management objects for visual resources (see map 3-29 for VRM classes).

Visual resource management classes are the degree of acceptable visual change within a characteristic landscape. A class is based on the physical and sociological characteristics of any given homogeneous area and serves as a management objective. The five classes are:

1. Class I: Areas (preservation) provide for natural ecological changes only. This class includes primitive areas, some natural areas, some wild and scenic rivers, and other similar sites where landscape modification activities should be restricted.
2. Class II: (partial retention of the landscape character) includes areas where changes in any of the basic elements (form, line, color, or texture) caused by management activity should not be evident in the characteristic landscape.
3. Class III: (partial retention of the landscape character) includes areas where changes in the basic elements (form, line, color, or texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.
4. Class IV: (modification of the landscape character) includes areas where changes may subordinate the original composition and character; however, they should reflect what could be a natural occurrence within the characteristic landscape.
5. Class V: (rehabilitation or enhancement of the landscape character) includes areas where change is needed. This class would apply to

areas where the quality class has been reduced because of unacceptable intrusions. It should be considered an interim short-term classification until one of the other classes can be reached through rehabilitation or enhancement.

## ORV DESIGNATIONS

Off-road vehicle designations were completed for 1,120,068 acres as part of the Green Mountain EIS area. Those designations stem from land-use decisions made in the 1979 Sweetwater and Moneta Management Framework plans. They became effective August 3, 1981, and were formally implemented in the field in 1982.

ORV regulations contained in 43 CFR 8340 apply to all ORVs, regardless of the purpose for which the vehicles are being used. Only emergency vehicles in emergency situations will be allowed to violate these designations without prior written permission. Permits may be issued for nonemergency use when feasible alternatives have been exhausted and the use is compatible with established resource management objectives.

BLM recognizes the differences between off-road vehicles and over-snow vehicles will be permitted in all areas (unless otherwise specifically limited or closed to over-snow vehicles), if they are operated in a responsible manner without damaging the vegetation or harming wildlife. ORV designation policy in Wyoming directs that the "limited" designation category (rather than the "open") be used. The ORV designations are either open, limited or closed.

**Open:** Vehicle travel is permitted in the area (both on and off roads) if the vehicle is operated responsibly in a manner that will not cause, or is unlikely to cause significant, undue damage to the soil, wildlife, wildlife habitat, improvements, cultural, or vegetative resources, or other authorized uses of the public lands.

**Limited:** Vehicle travel is permitted only on existing roads and vehicle routes that were in existence before the date of designation in the *Federal Register*. Vehicle travel off of existing vehicle routes is permitted only to accomplish necessary tasks and only if such travel does not result in resource damage.

Vehicle travel is permitted only on roads and vehicle routes designated by BLM. In areas where



## Affected Environment

final designation has not been completed, vehicle travel is limited to existing roads and vehicle routes as described above. Roads are posted as open or closed in those areas, and seasonal closures may be imposed.

Existing roads and vehicle routes are defined as routes existing before the date of designation, were constructed or created by the frequent passage of motor vehicles, and receive regular and continuous use. Additional vehicle routes may be authorized as needed.

Necessary tasks are defined as work requiring the use of a motor vehicle. Examples include picking up big game kills, repairing range improvements, managing livestock, mineral activities where surface disturbance does not total more than 5 acres, as described in the "5-acre exemption" under the 43 CFR 3809 regulations.

Resource damage is defined as leaving long-term signs of vehicle use (ruts) or causing erosion or water pollution and creating undue degradation of other vegetative or wildlife resources.

Closed: Vehicle travel is prohibited in the area. Access by means other than motorized vehicle is permitted. (See map 3-32.)

## ACCESS

As recreational demand increases, so will the associated access problems. Public lands can accommodate much of the demand if legal access to these lands is obtained. Limited funds for recreation will prohibit both extensive access acquisition and continued road maintenance. Priorities need to be assigned to acquisition of access and to road maintenance; unnecessary easements currently identified need to be eliminated; and poorly located and unneeded roads should be closed. (See map 3-33 for existing BLM and county roads in the resource area.)

## CULTURAL/NATURAL HISTORY RESOURCES

### Introduction

The following is a discussion of the cultural and natural history resources of the area, with emphasis on those resources likely to be

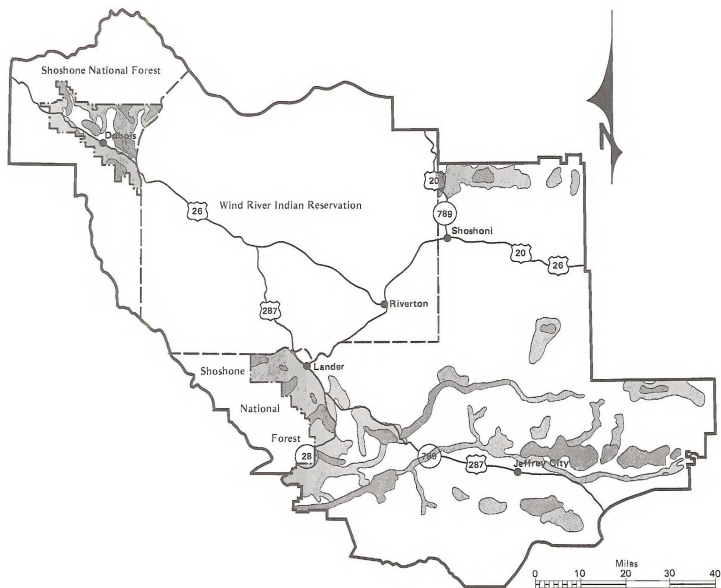
significantly affected by management actions listed in the various alternatives. Most of the narrative will deal with cultural resources, because of the fewer natural history resources have been identified in the area. Following a general discussion on the nature of resources found in the resource area, this section will concentrate on those resources that could be significantly affected by the management actions of the alternatives

### Resources Not Significantly Affected by the Management Actions of the Alternatives

Cultural resources are common in the Lander Resource Area and may be affected by the various management actions proposed within this RMP. However, there are certain standard protective measures in place already that are designed to minimize or negate adverse effects to cultural resources from proposed management actions (see the Management Guidance Common to All Alternatives section for details). These measures are required by laws, regulations, and policy and will continue to be used in the future. Continuation of these standard protective measures will ensure that certain cultural resources will not be adversely affected by the RMP management actions. As a result, those cultural resources not significantly affected by management actions will not be extensively discussed in the RMP (i.e., those prehistoric, protohistoric, and historic resources whose values can be recovered through data recovery methods and are also important only for their potential to yield information important in prehistory or history). Unavoidable impacts on significant resources of this type can usually be mitigated through the standard data recovery measures (collection, testing, excavation, etc.) included in the standard protection guidelines.

### Affected Resources

Cultural and natural history resources that cannot be mitigated by data recovery methods and/or having other important values often require measures beyond the standard protective measures to avoid adverse effects. The other values include cultural resources having intact associations with significant historical events or persons; outstanding qualities of construction, workmanship, style, or art; or distinctive characteristics of a period, type, method of construction, or significant entity of our past. Natural history



Scenery Quality Classes

-  Class A
-  Class B
-  Class C

Map 3-31  
Scenery Quality Classes  
Lander Resource Area

values in this category include natural history resources with outstanding geological, ecological, paleontological, and/or topographical features. These types of resources usually cannot escape adverse effects to their values by the standard protective measures. Common avoidance measures often cannot prevent adverse effects on the integrities of these resources, and data recovery measures may not be sufficient or appropriate and may themselves cause adverse effects on the resources. Therefore, these cultural and natural history resources could experience significant effects from some of the RMP management actions and will be extensively discussed.

### Cultural Resources (General)

Cultural resources in the Lander Resource Area represent human occupation over many thousands of years. Cultural history in this area is generally believed to have begun at least 12,000 years ago, when the first human groups entered this region. Since that time, human occupation of the resource area appears to have continued basically uninterrupted up to the present time.

Within the 12,000-year history of the area, there are three broad overlapping periods: the Prehistoric, Protohistoric, and Historic. Remains from each period are found throughout the resource area and are numerous in many areas (see table 3-21 for the status of these sites).

### Cultural Periods

#### The Prehistoric Period

This period dates from at least 12,000 years before the present (B.P.) to around 300 years B.P. The Prehistoric Period is characterized by a stable cultural phase, where the way of life appears to have changed very little throughout its time span. The peoples utilizing this region during the Prehistoric Period were Native American hunters and gatherers who adapted their lifestyle to the high-plains environment and roamed the region in search of food and shelter. The movements of these nomadic peoples were, to a large degree, determined by seasonal changes in resource availability. These people generally travelled in small bands, spending only a limited amount of time in any one location. For the most part, the material items of these groups were made from

naturally available resources. These resources included items such as stone, wood, bone, pelts, sinew, and plant fibers.

Although the Prehistoric Period was characterized by similar lifestyle strategies, several different cultural traditions appear to have dominated separate parts of the Prehistoric Period. These traditions and parts are defined by Frison (1978), and include the Paleo-Indian Period (7500 through 12,000 years B.P.), the Early Archaic Period (5000 through 8000 years B.P.), the Middle Archaic Period (2500 through 5000 years B.P.), the Late Archaic Period (1500 through 3000 years B.P.) and the Late Prehistoric Period (300 through 1750 years).

Common cultural resources of the Prehistoric Period include: lithic scatters, stone circle habitations, petroglyphs and/or pictographs, game drive lines, firehearths or firepits, lithic quarries, and rockshelter habitations. Area sites from the Prehistoric Period, which are removed from ourselves by centuries or millennia, generally contain mostly nonperishable remains such as stone, charcoal, pottery, or bone. Sometimes they have been affected by erosive forces, causing displacement or burial of the sites. Unlike some prehistoric sites in other regions, those in the Lander Resource Area generally do not contain nonperishable architectural features. For these reasons, prehistoric sites in this area are mostly important for the information they possess, although sites such as petroglyph/pictographs, may be considered important for their stylistic, artistic, or workmanship qualities.

#### The Protohistoric Period

This period is one of transition from the Prehistoric Period to the Historic Period. The Protohistoric Period is generally considered to have lasted about 100 years, beginning in the late 17th or early 18th century and extending to the early 19th century. The peoples and cultures native to this region experienced significant changes during this relatively short period of time. These changes were the result of the introduction of objects and ideas of recent European or Asian origin into the area. The most significant factor of change was probably the introduction of the horse. The introduction of this highly useful animal, along with imported glass, metal, and firearms (before actual contact between Euro-American groups and Native Americans) resulted in pronounced social, technological and economic changes that affected many aspects of the indigenous cultures. The events that occurred

## Affected Environment

TABLE 3-21  
STATUS OF CULTURAL SITES  
IN THE LANDER RESOURCE AREA

Site Type	On the National Register or Determined Eligible by the Keeper of the National Register	Considered Eligible for the National Register	Not Eligible	Uncertain Eligibility	No Information	Destroyed	Total
Prehistoric <sup>1</sup>	5	143	636	317	137	3	1,241
Historic	9	41	62	150	9	0	271
Total	14	184	698	467	146	3	1,512

<sup>1</sup> Protohistoric sites are included in this category due to their related characteristics.

during this period are usually placed by authors in either the Historic or Prehistoric periods, depending on the orientation of their work. Common site types of this period are similar to those of the prehistoric period, but they also include early trade items and objects indirectly derived from foreign sources. These sites are important because of their information potential, but they may also be considered important for their associations to certain present-day cultural groups, or for their religious artistic, stylistic, and workmanship qualities.

### Historic Period

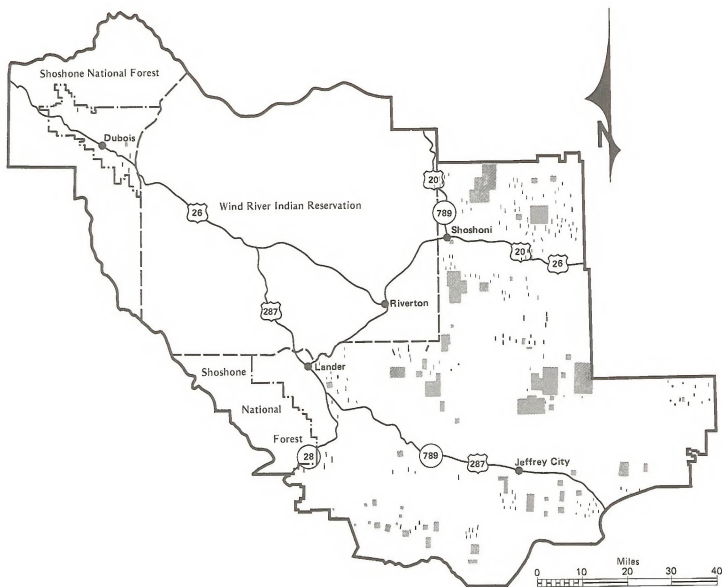
This period is generally considered to be the time during which written documents were maintained of the events that occurred in the area. The Historic Period is generally considered to have begun in the early 19th century, with the arrival of large, well organized fur trading expeditions into the region. The fur traders were followed by explorers, missionaries, emigrants, miners, stockgrowers, and merchants. The history of the land within the Lander Resource Area shares in many of the major events in Western American history. These events include: early Rocky Mountain fur trade, early military explorations, transcontinental emigration, Indian wars, gold mining, open-range stock grazing, transcontinental railroad-related development, agricultural development, and energy exploration. Common cultural resources of the Historic Period include: mining operations and settlements, stage stations and trails, emigrant trails, sites and landmarks, livestock improvements, agricultural/

commercial settlements, ranch developments, railroad installations, and oil and gas exploration installations.

Sites of the Historic Period are usually better preserved because of their recent age. Erosive forces have had less time to cause damage and decomposition, and perishable as well as nonperishable items may often exist at these sites. Architectural features are often intact, and we have the help of written sources to supplement our knowledge of many historical sites. For these reasons, Historic Period sites can be important in several ways. The historical associations of a site may be related to significant events or persons, thus making the site important to our history. A site may possess outstanding workmanship, stylistic qualities, or religious values that make the site unique and valuable, or a site may contain information potential that could yield important data about our history.

### Present Cultural Resources Inventory Data Base

Files search (Class I) inventories and intensive field inventories (Class III) have been conducted for BLM-sponsored or sanctioned projects since about 1975 in the Lander Resource Area. Since that time, approximately 89,000 (as of September 1984) acres of land have been inventoried at a Class III level. The inventoried acreage include approximately 3.5 percent of the resource area's total area within BLM surface jurisdiction (map 3-34 shows the general locations that have



Map 3-34  
Cultural Resource Class III Inventory Areas  
Lander Resource Area

## Affected Environment

received Class III inventories). These inventories have primarily been related to oil and gas exploration/development, uranium mining, and utility rights-of-way.

### Resource Data

The Lander Resource Area maintains a file of known cultural resources within the area. The resource area's cultural resource data has been gathered from various sources, including archeological and historical contractors, local informants and sources, BLM and state government agencies, and historical accounts. The files include information on prehistoric, protohistoric, and historic cultural resources of many types. However, most cultural resources under 50 years of age (recent) are not formally recorded unless they are of special significance; as a result, the files do not include most known cultural resource sites of recent origin.

Table 3-22 details the recorded sites in the resource area and their current status. This status is defined in terms of each site's National Register importance and quality (National Register definitions are detailed in the Glossary).

### Specific Affected Cultural Resources

The following describes the specific important cultural resources that would be affected by the proposed management actions of the RMP. Table 3-22 also briefly describes those resources, and map 3-35 shows the locations of these sites.

#### Oregon/Mormon Trail

The Oregon/Mormon Trail is two trails that follow the same route in the Lander Resource Area. The trails mark the mass emigration route of pioneering Americans who were headed west in search of a new life (see map 3-36 for trail location). The trails' destinations varied, but Oregon, California, and Utah were the main goals for the majority of the emigrants. The Oregon/Mormon Trail was in use from 1840 to 1912. It is nationally recognized as the symbol of one of the most important and influential movements of people in U.S. history.

#### The Oregon National Historic Trail

This is the famous trans-continental route that was a natural migration route for prehistoric, protohistoric, and early historic groups and later became the main highway for European-American emigrants looking for new land and a new beginning in the largely unsettled western territories. The emigrants were spurred on by economic hardship in the East and a sense of destiny that America should compete with foreign powers and claim the western lands for the United States. This westward movement occurred primarily from the 1840s to the 1860s, but the trail remained in use as a wagon trail as late as 1912. Estimates of the number of people who used the Oregon Trail range from 300,000 to 500,000 during the trail's entire history. The majority of the emigrants travelled with wagon trains, spending an average of 6 months walking and riding over the arduous route. For many, the trials of the trail were too much. At least 20,000 died along the way.

The final destinations of the travelers varied, but many early emigrant groups made their goals the territories of Oregon and California. A large number of the emigrants were interested in settling the widely available lands in Oregon and California or in setting up commercial pursuits to serve the settlements. Later, precious mineral discoveries became an impetus for migration to the West and often provided the basis for settlement of lands previously bypassed by the emigrants.

In the 1850s and 1860s, the trail was used extensively by the military and commercial interests. The supply needs of settlements, travelers, and Indian tribes under treaty enabled freighting companies to operate, while military garrisons were assigned to posts along the trail to protect the emigrants and freighters. Communication services also sprang up along the trail; the most famous was the Pony Express. Although the Pony Express was driven out of business after just two years (in 1861) by the transcontinental telegraph, it remains etched in our national memory as an outstanding American achievement. Stage lines also operated on the Oregon Trail, but some were forced to move to the more southern Overland Trail because of fears of Indian attacks.

The contributions of the use of this early road to the settlement and the economic development of the Western United States were enormous. Congress recognized this in 1978 by designating the Oregon Trail as a National Historic Trail. Under national trail status, the federally administered



**TABLE 3-22**  
**SELECTED CULTURAL SITES AND NATIONAL REGISTER STATUS**

Affected Cultural/Natural History Resource	Type	National Register Status	Size	Location or Resource
1. Castle Gardens	Prehistoric and Historic Rock Art Site	Enrolled on the National Register.	80 acres	Gas Hills M.U.
2. Oregon/Mormon Trail	Historic Emigrant Trail	Designated as a National Historic Trail; many segments eligible for the National Register.	89 linear miles, surrounded by ½ mile corridor.	Gas Hills, Beaver Creek M.U.'s
3. Oregon/Mormon Trail Sites				
A. Devil's Gate Landmark	Historic Emigrant Landmark	Within the enrolled Sun Ranch National Historic Landmark.	400 acres	Gas Hills M.U.
B. Martin's Cove	Historic Emigrant Disaster Site	Enrolled on the National Register.	600 acres	Gas Hills M.U.
C. Split Rock Landmark	Historic Emigrant Landmark	Enrolled on the National Register.	640 acres	Beaver Creek M.U.
D. Ice Spring Slough	Historic Emigrant Trail Site	Considered eligible to the National Register but no official designation at present.	1,700 acres	Beaver Creek M.U.
E. Rocky Ridge	Historic Emigrant Trail Site	Considered eligible to the National Register but no official designation at present.	840 acres	Beaver Creek M.U.
F. Gillespie Place/ Radium Springs	Historic Structure/Campsite	Considered eligible to the National Register but no official designation at present.	40 acres	Beaver Creek M.U.
G. Willies Handcart Site	Historic Emigrant Disaster Site	Considered eligible to the National Register but no official designation at present.	40 acres	Beaver Creek M.U.
H. Burnt Ranch	Historic Emigrant Campsite/ Station	Determined eligible to the National Register.	561 acres	Beaver Creek M.U.

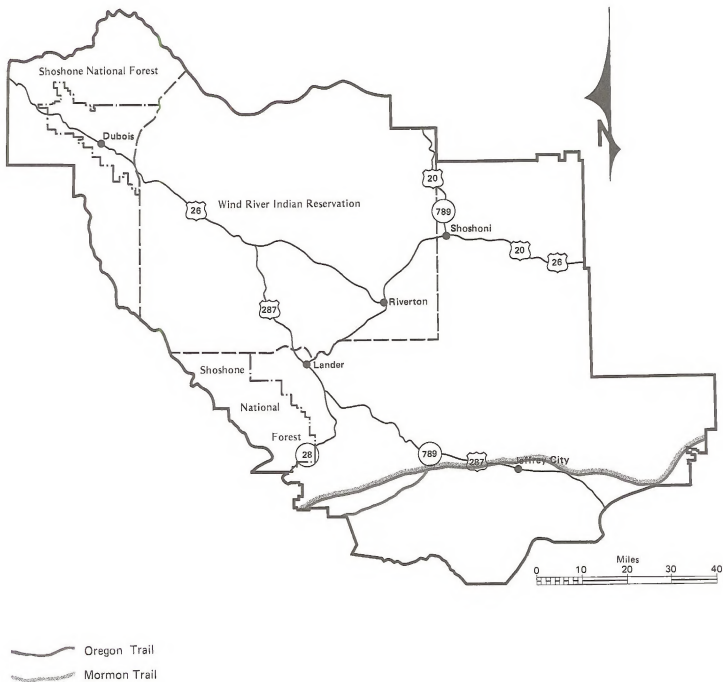


**TABLE 3-22 (Continued)**  
**SELECTED CULTURAL SITES AND NATIONAL REGISTER STATUS**

Affected Cultural/Natural History Resource	Type	National Register Status	Size	Location or Resource
4. Aspen Grove Campsite	Historic Fur Trappers Campsite	Considered eligible to the National Register, but no official designation at present.	280 acres	Beaver Creek M.U.
5. South Pass Historic Mining District	Historical Gold Mines, Settlements, and Military Sites	Certain sites with the District enrolled on the National Register; many others considered eligible; whole District considered eligible to the National Register.	16,080 acres	South Pass M.U.
6. Warm Spring Canyon	Historical Tie-Flume and Natural Features.	Considered eligible to the National Register, but no official designation at present.	190 acres	Dubois Area M.U.
7. Sparhawk Cabin	Historical Cabin	Considered eligible to the National Register, but no official designation at present.	10 acres	Green Mountain M.U.
8. Red Canyon	Outstanding Topographical Natural Feature	Designated as a Natural National Landmark.	5,760 acres	Red Canyon M.U.
9. Beaver Rim	Outstanding Geological and Stratigraphical Natural Feature	Identified as a potential National Natural Landmark.	1,120 acres	Beaver Creek M.U.
10. Dubois Badlands	Outstanding Topographical Natural Feature	Identified as a potential National Natural Landmark, (but needs more study).	4,520 acres	Dubois Badlands M.U.



Map 3-35  
Special Cultural / Natural History Areas  
Lander Resource Area



Map 3-36  
Oregon - Mormon Trail Route  
Lander Resource Area

## Affected Environment

portions of the trail are protected from unwarranted impacts and are maintained for public enjoyment and use.

### The Mormon Pioneer National Historic Trail

In the midst of the massive migrations to Oregon and California, there was a smaller migration headed toward Utah. Most of these emigrants were Mormons (members of the Church of Jesus Christ of Latter-Day Saints), which was founded in 1830. The Mormon emigrant's goal was to get to the great Salt Lake Valley where the new center of the Mormon Church had been established.

In 1846 to 1847, an advance party, led by church leader Brigham Young, headed west from Illinois and finally chose their new home in the Great Salt Lake Valley. The route these first pioneer Mormons used is the Mormon Pioneer National Historic Trail. In the two decades following the pioneering trek, thousands of Mormons, from the eastern U.S. and Europe, travelled to Utah to live in the "promised land."

The route the Mormons used to get as far as mid-Nebraska differed from the Oregon Trail. The two trails then met on the Platte River and from there to Fort Bridger (in southeast Wyoming), the two trails basically followed the same route (see map 3-37). For that reason, the name Oregon/Mormon Trail is used in the Lander Resource Area.

The Mormon Pioneer Trail compliments the Oregon Trail as a major symbol of our nation's expansion. Whereas the Oregon Trail contributed more to the settlement and economic development of the far western states, the Mormon trail was one of the major factors in the initial development of the interior West. Congress observed the importance of the Mormon Pioneer Trail by designating it as a National Historic Trail in 1978. As with the Oregon Trail, the Mormon Pioneer Trail is now afforded protection from unwarranted disturbances and is maintained for public enjoyment and use.

Present Status of the Oregon/Mormon Trail and Related Sites. Now, well over 100 years old, the trail and its historical sites have suffered from weathering, erosion, and modern development in many areas. Much of the trail made by the emigrant wagons and people has disappeared, and most stage stations, campsites, telegraph lines, forts, and other-related sites no longer exist or are difficult to locate. Through the Western U.S., the present condition of the Oregon/Mormon Trail and its sites varies widely from location to location.

Nonetheless, the present condition of the trail in the Lander Resource Area is generally good, primarily because modern development along the trail has not been as intensive as in other parts of the nation. Much of the trail in the resource area has never been impacted by more than minor modern vehicle traffic and erosion. As a result, much of the trail in the resource area retains similar settings and conditions as when the pioneers traveled the route. This situation has prompted the National Park Service to describe the segment within the Lander Resource Area as one of the very best stretches of the Oregon Trail left in any of the six states through which the trail passes (Oregon Trail Comprehensive Management and Use Plan 1981). The trail itself sometimes exhibits the original ruts of the emigrant wagons, which can be seen in a few rocky or protected areas. There are other stretches where the trail appears as one or more swales (dished-out areas caused by erosion), which indicate the paths of the wagons. Sometimes the swales are relatively deep and narrow, but sometimes they are very wide and shallow, better resembling a "swath of disturbance" that is known to spread up to 1/2 mile wide.

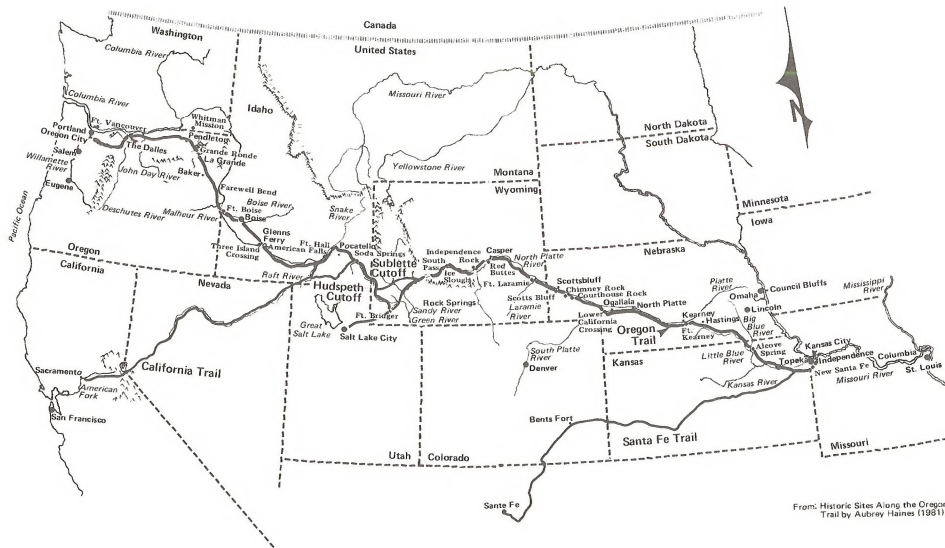
Where the trail is impacted by minor erosion and modern vehicular traffic, one may see a two-track road surrounded by the above mentioned swales, or sometimes a two-track road on top of or next to the original rut areas. All of these conditions, when matched with settings largely undisturbed by modern intrusions, can contribute to an impression of how the original trail must have appeared.

Land status along the trail is predominantly private and BLM lands, with some state land. All segments of the trail on BLM lands are within a protective corridor, which may prohibit modern intrusions or uses within the trail corridor. Map 3-36 details the location of the trail within the RMP area, and table 3-22 describes the present status of major sites on BLM-administered land related to both the Oregon and Mormon Pioneer trails.

### Important Oregon/Mormon Trail sites in the Lander Resource Area

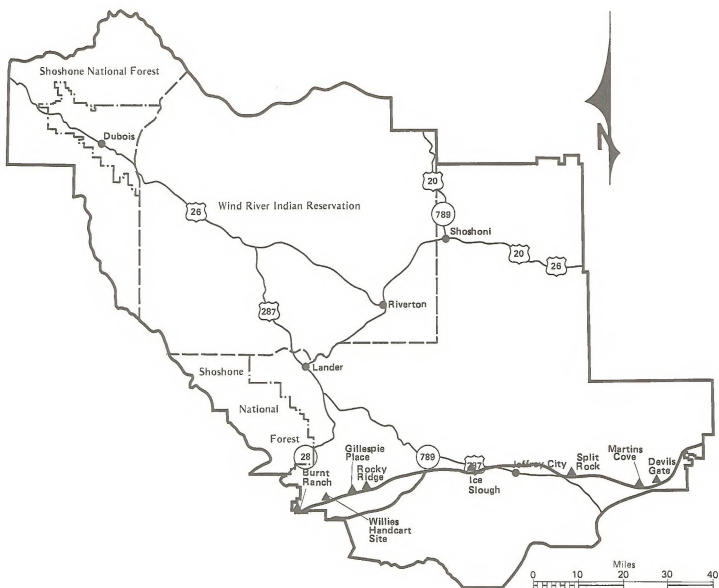
The following describes the specific important Oregon/Mormon Pioneer Trail resources in the Lander Resource Area. Map 3-38 shows the locations of these sites.

**Devil's Gate Historic Landmark.** Devil's Gate, part of the Sweetwater Rocks, is one of the most well-known landmarks along the Oregon/Mormon



From: Historic Sites Along the Oregon Trail by Aubrey Haines (1981).

Map 3-37  
Major Emigrant Trails  
of the Western United States



 Oregon-Mormon Trail  
 Sites

Map 3-38  
 Major Oregon - Mormon Trail Sites  
 Lander Resource Area

## Affected Environment

Trail. Devil's Gate is a unique location where the Sweetwater River has cut through the Sweetwater Rocks leaving a narrow cleft measuring about 370 feet deep, 2,500 feet long, and less than 50 feet wide in places. Located 5 miles southwest of Independence Rock, Devil's Gate lies near the point where the Oregon/Mormon Trail began to parallel the Sweetwater River. Many diaries of the pioneers include remarks about Devil's Gate, and some of the emigrants wrote or carved their names on the cliffs around this landmark.

The Devil's Gate vicinity was used both as a temporary camping area for emigrant parties and as a semi-permanent outpost for business enterprises and military garrisons during the western migration period. Two trading posts and a stage station were located at Devil's Gate in the 1850s, and during the early 1860s a Pony Express station was operated for a short time. At the same time, soldiers were stationed at Devil's Gate to protect emigrants and stage lines from Indian attack. None of the original buildings from this era still stand, but the area still retains much of its original historical and natural setting. Several gravesites are also known in the Devil's Gate area, although only one (T.P. Baker, who died in 1864) is now marked and identified. The Sun Ranch, located just west of Devil's Gate along the Sweetwater River, was one of the first open-range ranches in Wyoming. The original ranch house, built in 1872, still stands at the present-day ranch headquarters.

Land status of the actual Devil's Gate, where the Sweetwater River flows through the rocks, is comprised entirely of public lands administered by BLM. The Devil's Gate and lands around it have been withdrawn from all forms of appropriation since 1970.

The Oregon Trail passes through BLM, state and private lands, and the portions on BLM are currently within a protective corridor. The various local posts, stations, and early ranch developments lie on both private and BLM-administered lands. Those sites on BLM lands are currently under application for withdrawal. Devil's Gate and its related sites are also within the boundaries of the enrolled Sun Ranch National Historic Landmark.

**Martin's Cove Historic Site.** Martin's Cove describes a sheltered recess among the Sweetwater Rocks where disaster struck a group of Mormon emigrants in 1856. The cove is located next to the bare granitic hills of the Sweetwater Rocks, just north of the Sweetwater River, about 2 miles west of Devil's Gate and 1 mile north of the Oregon/Mormon Trail.

The setting of this disaster involved Captain Edward Martin's 6th Handcart Company, a large group of Mormon converts who were headed to the Salt Lake Valley of Utah. The company originated in England, and they planned to walk across the interior of the United States, while pulling two wheeled handcarts. An early winter storm caught them weak and unprepared, and the emigrants took refuge in Martin's Cove. Before the company was rescued, 145 people in the company died from exposure and starvation.

Land status of Martin's Cove Site is entirely composed of public land administered by BLM. Martin's Cove site is also enrolled as a National Historic Place on the National Register.

**Split Rock Historic Landmark.** Split Rock is a prominent and highly visible landmark 18 miles west of Devil's Gate, which served as a geographical guide for Indians, furtraders and emigrants. This high cleft in the granite of the Sweetwater Rocks could be seen soon after the emigrants left Devil's Gate, and the area near Split Rock was a favorite campspot. During the 1860s, the Pony Express, Overland Stage Line, and the Sixth Ohio Cavalry maintained posts in the local area. Although little, if any, of the 1860s station sites remain, the general area is little changed from its 19th century historical setting.

Land status of the Split Rock Landmark is composed of BLM land, and the site and the lands around it have been withdrawn from appropriation of all types since 1970. The Oregon Trail in the vicinity of Split Rock is primarily located on BLM land, but some of the trail also lies on private land. The trail segments on BLM land are within a protective corridor at the present time. The early stage, mail and military stations in the area are located on both BLM and private lands, and most of these sites on BLM land are under application for withdrawal from appropriation. Split Rock Landmark is enrolled as a National Historic Place on the National Register.

**Ice Spring Slough Historical Site.** Ice Spring Slough is a wide, shallow, swampy drainage that was often mentioned by the emigrant travellers on the Oregon/Mormon Trail. This spring-fed boggy area, about 23 miles west of the Split Rock Landmark, was paralleled by the trail for a short distance before the trail crossed it. The emigrants used the slough for water and reportedly for a source of summertime ice. The ice, found underneath peat and water layers, could be obtained even in the hot summer months, and this oddity was a constant and welcome surprise to the pioneers. Along the banks of the slough was



## Affected Environment

a stage/Pony Express station, which operated in the 1860s. The slough presently contains modern intrusions over some of its length, but much of the rest of the slough and its surroundings still appear the same as when the pioneers encountered it. No remains of the stage/Pony Express station have been discovered.

Land status of the slough is split between private and BLM lands. The Oregon/Mormon Trail, in the vicinity of Ice Spring Slough, is situated on BLM and private lands, and the segments on BLM land are within a protective corridor at this time. The stage station has not been definitely located, and it could lie either on private or BLM land. The Ice Spring Slough is considered eligible for nomination to the National Register of Historic Places, but no formal nomination procedures have been completed for this site.

**Rocky Ridge Historic Area.** The Rocky Ridge was a landmark of a different sort for the Oregon/Mormon Trail emigrants. This area, about 19 miles west of Ice Spring Slough, was a spot where the emigrants were forced to leave the lowlands along the Sweetwater River and cross a high, barren and rocky ridgeline located north of the river. Many of the pioneers' diaries speak of the rough jarring ride they endured and the difficulty of the steep climb over the ridge. The area today still exhibits rust stains on the rocks from the iron-tire wheels of the early wagons. Piles of rocks, moved out of the paths of the wagons by the emigrants, can also be seen. The Rocky Ridge area is very isolated and still retains most of its historical and natural character.

Land status of Rocky Ridge and the Oregon Trail in this local area is nearly all BLM, but some private land is nearby. Some of the trail and surrounding ridge has been withdrawn from appropriation since 1970. The Rocky Ridge appears to be eligible for National Register nomination, though it has never been formally evaluated.

**Gillespie Place/Radium Spring.** Gillespie Place/Radium Spring is a historical site located along the Oregon/Mormon Trail just east of the historical mining camp of Lewiston. This site consists of two standing structures, several foundations with wall remains, and a flowing spring. The Gillespie Place/Radium Spring site, located along a major transportation route, was associated with several historical events of Wyoming's early territorial and state history.

The earliest historical use of the site probably occurred during the Oregon/Mormon Trail era when early emigrants passed through the region

in the 1840s. Although no emigrant diary accounts of this site are known at this time, the site's spring was probably often used as a convenient water source. Some overnight emigrant camping probably also occurred here. Radium Spring probably continued to be used by travelers over the entire emigrant trail era. U.S. military units, common along the Oregon/Mormon Trail in the 1860s, may have also utilized the spring and surrounding area. In the 1880s, mineral exploration began in earnest in the Lewiston Mining District, which included the Radium Spring area. Although no records are available, some small-scale exploration probably occurred in the local area.

After the turn of the century, the structures were built on the site. Presently, we do not know exactly when they were constructed, but artifactual evidence points to pre-1920s dates of occupation for at least some of the structures. This evidence corresponds to newspaper accounts of a Mrs. S.F. Gillespie having settled on 160 acres in the immediate area sometime around 1910 (Wyoming State Journal 1918). Touted as Wyoming's Copper Queen, Mrs. Gillespie seems to have been heavily involved in mining ventures in the local area around Lewiston (including Gillespie Place). Sometime during this period, the spring was claimed to have radium in its waters and was advertised to have healthful properties, but no use of the spring for this purpose is known.

Apparently, the site was occupied by Mrs. Gillespie until the early 1930s, based on local informants (Halstead and Mataeson 1984). The Gillespie Place/Radium Springs lies completely on public lands, and presently is in fair shape. Cattle trampling is moderate to heavy over the site, and the two remaining structures are used by cattle for shade and could be in danger of collapsing from cattle rubbing. Although the site has never been recorded, it appears that its associations with the Oregon/Mormon Trail and the early Lewiston mining boom make it eligible for nomination to the National Register.

**Willies Handcart Site.** This site is the scene of a second Mormon handcart company disaster. The site, located about 6 miles west of Radium Spring/Gillespie Place, lies in the narrow floodplain of Rock Creek, near the spot where the Oregon Trail crosses the creek.

This disaster occurred as a result of an early winter storm that engulfed the region in November of 1856. This is the same storm that trapped Martin's Handcart Company. Willies Handcart Company, having gotten a slightly earlier start on their trek from the Midwest to Utah, were

## Affected Environment

overtaken by the storm and took shelter in the meager protection of shallow creek bottoms in the South Pass area. Between their stops at Rock Creek and Willow Creek, a total of 77 people in the company perished from exposure before they were rescued. The locations of the gravesites are not precisely known, but a marker now lies at Rock Creek commemorating the fallen emigrants. An annual commemorative meeting is also held along Rock Creek.

Land status of the Willies Handcart site at Rock Creek is split between private and BLM-administered lands. The commemorative marker is situated on private land, and the commemorative meeting site is located a short distance south of the marker on BLM-administered lands. The Willies Handcart site on Rock Creek appears to be eligible for National Register nomination, although no formal documentation on the site has been submitted.

**Burnt Ranch.** Burnt Ranch is a famous Oregon/Mormon Trail emigrant campsite, way-station and stage stop. It was also the location of the ninth and last crossing of the Sweetwater River for the emigrants. Named Burnt Ranch because of the numerous times the station was burned down, this site was a major crossroads throughout the Oregon/Mormon Trail era. The Seminole Cut-off rejoined the main Oregon/Mormon Trail at Burnt Ranch, and the Lander Cut-off also began at this spot, making Burnt Ranch a well known site. As a consequence of its location, the Burnt Ranch area was heavily used by emigrants, soldiers and commercial interests. Near Burnt Ranch was a U.S. mail station, commonly known as the Mormon Mail Station because it was used on the mail route to Salt Lake City.

The Burnt Ranch site is privately owned and is managed for livestock ranching and farming. Several standing structures are located at the site. These structures were probably built in the early 1900s for ranching related purposes. The historical setting of the Burnt Ranch area is intact, and the site is considered eligible for nomination to the National Register.

### South Pass Mining Area

The South Pass mining area is a historical gold mining region located in west-central Wyoming on the southern end of the Wind River mountain range. South Pass was and still is the largest gold mining area in Wyoming, and it has yielded over a million dollars of gold during its history.

When compared with other mining centers in the West, this yield is considered small. However, the influences of this marginal gold mining area on the early development of the Wyoming Territory and the state of Wyoming were considerable.

Gold was first discovered in the South Pass mining area in 1842 by a trapper with the American Fur Company. This was followed by limited prospecting in the 1850s and early 1860s, but no organized operations were established during that time because of Indian hostilities and/or unprofitable diggings. It was not until 1867 that large numbers of prospectors entered this area, which was known at that time as the "Sweetwater Mines" area. The year 1867 was a very active period, which included the discovery of most of the major gold deposits, including the Carrissa, Miner's Delight, and King Solomon lodes. By 1868 an estimated 1,000 to 1,500 people lived in the area, and the towns of South Pass City and Atlantic City were established. However, the mining boom died quickly, and by 1872, the original gold prospects were played out and the area (including the towns) became almost deserted. Recurrent periods of gold mining activity occurred in the South Pass area in the 1880s, 1907 to 1911, and the 1930s, but the efforts were never very profitable.

Although the mining activities proved short-lived and mostly unprofitable, development in the South Pass region had major social and cultural impacts on Wyoming. The South Pass towns were some of the first permanent settlements in the region, and they generated a new economic base. The economic stimuli from mining operations also encouraged growth of the budding regional economy.

Freighting companies, merchants and speculators benefitted from the importation of equipment and the sales of basic supplies, land and claims. Stagecoach lines also sprang up to carry people, goods and mail to and from the mining area market. The increased economic activity even had impacts on markets as far away as Salt Lake City and Denver. Settlement of the Wind River Basin and the development of the Lander Valley's economy were also highly influenced by the South Pass mining activity. The first settlers in the Lander area came mainly from the South Pass settlements, and the early farming communities in the valleys were able to rely on the mining area markets for much of their livelihoods.

The mining settlements also provided added impetus to the coming cattle industry, by contributing capital and markets for some of the first cattle ranching outfits in the state.

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Along with the mining industry came early military and transportation endeavors. Fort Stambaugh, built in 1870, was an army post constructed near Atlantic City to offer protection to the miners and other settlers from hostile Indians. Occupied until 1877, the fort was not much involved in hostilities against Indians, and instead, became an important supply station for the local area.

Stagecoach lines sprang up to serve the needs of the miners and bring new people into the area. Stage roads from Green River, Point of Rocks and Lander all went through the South Pass area. They continued to provide an important service until the early 1900s.

The South Pass settlements have survived up to the present by supporting limited gold mining operations, cattle and sheep grazing, small commercial concerns, and recent iron-ore extraction operations.

Interest in gold mining has continued and is again becoming more popular because of higher gold prices. The majority of the gold mining interest has been manifested by small-scale operators working previously mined locations over intermittent periods. Atlantic City and South Pass City are still small towns and share a slowly increasing tourist economy in addition to the more traditional mining, livestock and mercantile pursuits.

Present Status of Historic Sites in the Area. The known historical sites of the South Pass mining area are in various states of preservation. They range from good to destroyed in their condition. Most of the sites still remaining are complex because they have been reused over the years and have often been altered to accommodate new mining technologies. As a result, there are many historical sites that have elements of several different periods at the same spot. The elements within each site are in varying stages of deterioration. For example, at Miner's Delight townsite, the original 1867 to 1880 elements are only in evidence from structural foundations and some decaying mining equipment. The site's 1910-era elements consist of several standing buildings that range from good to ruinous condition, and several mining equipment items. The 1930s-era components of Miner's Delight townsite consist of the remodeled interiors of some of the 1910-era structures, several outhouses, and various pieces of mining equipment.

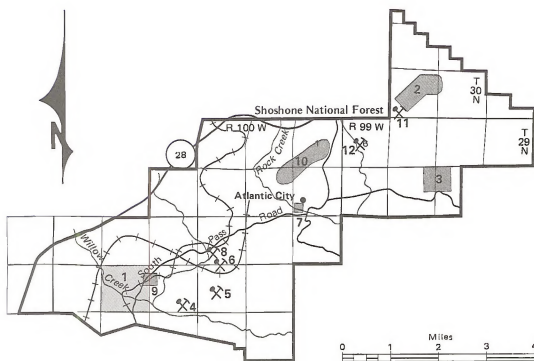
Part of the South Pass mining area appears to be eligible for the National Register as a National Register District. Several individual sites within the area have already been enrolled on the National Register, but no formal nomination procedures for

the whole area have been initiated. Land status of the South Pass area is split between BLM, private and state lands. BLM administers the largest amount of land, but the historical mining resources are probably spread equally between BLM and private lands. Twenty-four acres of BLM land have been leased to the state of Wyoming for historical purposes, and 820 additional acres of BLM land have been segregated from mineral entry because of historical values. Not all of the historical sites in the South Pass mining area are known, but there is good knowledge of most of the major sites. Map 3-39 shows the locations of some of the major sites within the South Pass mining area, and Table 3-23 describes the present status of those sites.

### Castle Gardens Petroglyph/Pictograph Area

The Castle Gardens Petroglyph/Pictograph area is a well-known rock art area located in central Wyoming. The area contains a large number of prehistoric drawings etched in and/or painted on sandstone. The rock art is recognized as some of the best in the Wyoming region, and has become well known within the Northwestern Plains. Several styles of art are evident, and many excellent shield motif representations are present. The age of the prehistoric rock art is unknown, but the functions of the drawings are assumed to be primarily concerned with spiritual beliefs. The rock art can be found over a large portion of the Castle Gardens uplifted area, which covers an area 6 miles long by 1 mile wide. The majority of the rock art is, however, located at the far eastern end of the Castle Gardens area.

There are also other prehistoric cultural resources known in the area. Lithic scatters and campsites are both known to occur, as well as isolated artifacts. One of the campsites was excavated in 1982 (Walker and Todd 1984), and was found to be an area where small prehistoric groups had camped on two different occasions. These groups produced stone tools, processed some plant foods, and butchered at least two bison, parts of which were cooked at the site. Through radio-carbon dating techniques, the occupations at the campsites were determined to have occurred around 650 and 750 years ago. Evidence from other local prehistoric sites indicate occupation of the Castle Gardens area occurred at several other times in prehistory.



- |  |  |
|--|--|
|  | 1 South Pass City and surrounding lands      |
|  | 2 Miners Delight Townsite and Mining Complex |
|  | 3 Fort Stambaugh                             |
|  | 4 Carrie Shields Mine                        |
|  | 5 B & H Mine                                 |
|  | 6 Barr Mine                                  |
|  | 7 Lemley Mill                                |
|  | 8 King Solomon Mine                          |
|  | 9 Carissa Mining Complex                     |
|  | 10 Caribou/Diana Mining Complex              |
|  | 11 Gold Dollar Mine                          |
|  | 12 Snowbird Mine                             |

Map 3-39  
Major Historic Sites  
South Pass

**TABLE 3-23**  
**NATIONAL REGISTER STATUS OF SITES IN THE SOUTH PASS MINING AREA**

Site	Type	Natural Register Status	Land Use Status	Site Owner(s)/Administrator(s)	Site Size
1. South Pass City (includes all of Section 20)	Historic Mining Town and Mining Operations Site	Enrolled on the National Register	Public land portions segregated from new mineral entry; old South Pass City is run as a State Historical Site.	Private, State, and BLM	640 acres
2. Miners Delight Townsite and Mining Complex	Historic Mining Town and Mining Operations Site	Enrolled on the National Register	Public land portions segregated from new mineral entry; Miner's Delight Townsite managed by BLM as Historical Ghost Town.	BLM and Private	266 acres
3. Fort Stambaugh	Historic U.S. Army Fort	Enrolled on the National Register	Portion of site on public land is segregated from new mineral entry.	Private and BLM	160 acres
4. Shields Mine	Historical Mine and Habitations	Considered eligible to the National Register	Segregated from new mineral entry.	BLM	10 acres
5. B & H Mine	Historical Mine and Habitations	Considered eligible to the National Register	Segregated from new mineral entry.	BLM	10 acres
6. Barr Mine and Cabins	Historical Mine and Habitations	Considered eligible to the National Register	Segregated from new mineral entry.	BLM	5 acres
7. Lemley Mill	Historical Ore Mill	Considered eligible to the National Register	Open to mining.	BLM	10 acres
8. King Solomon Mine	Historical Mine	Probably eligible to the National Register	Open to mining.	BLM	10 acres
9. Carissa Mine and Mill Complex	Historical Mine	Considered eligible to the National Register	Open to mining.	Private	40 acres
10. Caribou/Diana Mining Complex	Historical Mining Areas	Probably eligible to the National Register	Open to mining.	Mostly Private	approx. 240 acres
11. Gold Dollar Mine	Historical Mine	Considered eligible to the National Register	Open to mining.	BLM	20 acres
12. Snowbird Mine	Historical Mine	Considered eligible to the National Register	Most of public land portions segregated from new mineral entry.	BLM and Private	40 acres



## Affected Environment

At the present, a picnicking and interpretation area is located near the major rock art panels. Fences have been placed around the panels to deter vandalism.

The Castle Gardens Petroglyph/Pictograph site was first recorded in the early 1940s (Sowers 1941). Since then, it has become well-known, and the rock art has suffered from vandalism and weathering. In the 1960s, BLM constructed a road into the site and built a picnic area and interpretive site. Although protective fences were installed around the rock art panels at that time, vandalism is still occasionally occurring. Erosion, from weathering of the sandstone faces to increased rill formation from pedestrian traffic, is also occurring and may increase if preventative measures are not taken.

### Warm Spring Canyon Natural Bridge, Flume, and Geyser

The Warm Spring Canyon Natural Bridge, flume and geyser is a unique historical and natural area located on the lower slopes of the northern Wind River Mountains near Dubois, Wyoming. The natural and historical elements of this area are very closely related and will be dealt with together in this section.

The historical character of the area is manifested in a flume that runs down Warm Spring Canyon. This flume, built in 1928, was designed to transport wooden railroad ties from mountain timber-cutting areas to the Wind River. Once on the Wind River, the ties were floated down to processing plants where railroad companies picked them up for use on the many railroad lines of the region.

The flume was part of an early system of railroad tie procurement that relied on few machines. Instead, mountain camps of woodcutters were set up where the ties were roughhewn from trees, mostly by hand. The woodcutters were called tie hacks and some were so skilled they could produce an almost finished tie by hand in a short time. No adequate haul roads existed at the time, so instead the Warm Spring Canyon Flume was designed to transport the handhewn ties down to the Wind River. All of this activity began in the Warm Springs area in the 1920s, and the flume was completed in 1928, at a cost of \$64,000. The flume spanned 9 steep, twisting miles and was often suspended on the walls of the canyon because of the stream's narrow course. The flume utilized water to run the ties down to the river, and during its active life carried hundreds of thousands of ties out of the mountains. It was

finally abandoned in 1942, when a haul road was completed and more economical trucks were used to transport the ties (Pinkerton 1981).

The portion of the flume that lies on BLM land is near the lower end of the canyon. It is here where the flume encounters a natural curiosity called the "Natural Bridge." This natural bridge is a limestone cavity through which Warm Spring Creek flows. The flume was built through the natural bridge and is suspended on its walls.

Another nearby natural phenomenon unique to the area is an inactive geyser, which lies just above the canyon. This geyser now more closely resembles a warm spring situated deep inside the old geyser pipe.

The portion of the flume on BLM land has somewhat deteriorated because of the elements and landslides. Despite these ongoing processes, the flume is still in fair shape overall, and the segment within the natural bridge has been shielded and remains in good condition. However, some vandalism has affected the flume inside the bridge, and many of the bridge's natural features have been damaged by vandals. The inactive geyser has some modern trash around it, but otherwise it is in good condition. Limited access to the area has probably deterred much damage to the area's features, and this will probably continue to be the situation in the future.

Land status of the flume itself is mostly composed of U.S. Forest Service lands. A small part, near the lower end of the flume's course, lies on BLM and private land. The natural bridge and geyser are found on BLM lands. The Warm Spring Flume, natural bridge, and geyser area is considered eligible to the National Register, but no formal nomination procedures have been completed for this site.

### Sparhawk Cabin

The Sparhawk Cabin is a historical site located on top of Green Mountain. It consists of a well-built log cabin that was apparently built in the 1930s. The cabin was constructed by an enigmatic character named Frank Sparhawk, who was a periodic resident of the Green Mountain-Sweetwater Valley area and frequented the area periodically from the early 1900s until the late 1940s. No one is sure what Sparhawk's major activities were on Green Mountain, but according to an interview with an elderly area resident, Sparhawk built a flume on Green Mountain to transport timber down to the nearby Crooks Gap area. Mr. Sparhawk was also, according to a 1939

## Affected Environment

Wyoming State Journal article, searching for a meteorite he saw hit Green Mountain in 1901, but no one knows if the meteorite was ever found (Connell 1980).

The cabin site, secluded in a stand of lodgepole pines, remains in good shape. It consists of a rectangular structure made of very large logs. Chinking can still be seen to fill gaps between the logs. The roof logs extend beyond the front and back walls to form porch-like enclosures in both the front and back of the cabin. The cabin also has Sparhawk's name spelled out above the front door with rough tree twigs and roots, making it easy for later visitors to identify the cabin's owner.

The Sparhawk Cabin site has suffered from various forms of vandalism over the years, but is still in fair-to-good shape. Most of the interior furnishings and artifacts have been stolen or damaged, and the interior floor has been dug into because of local legends of buried riches supposedly hidden by Sparhawk. The structure itself is in fair to good shape and, although the roof has somewhat collapsed, the walls are in no immediate danger of collapsing.

This historical site appears to be eligible for National Register nomination. The site is worthy of preservation because it is a well preserved and a unique remnant of the settlement of Wyoming and is a reminder of the colorful characters who were a part of early Wyoming history.

## Specific Affected Natural History Resource

Natural history resources in the Lander Resource Area represent unique and significant geological and/or ecological resources that have been identified and evaluated by the National Park Service as potential National Natural Landmarks. Types of these resources include: unique vegetational communities, classic examples of geological processes, and/or outstanding stratigraphic and topographical areas. Nearly all activities under BLM management involving surface disturbance would adversely affect the natural history resources in question. Map 3-35 shows the location of the natural history resources, and table 3-22 describes the present status of these resources.

## Red Canyon Designated National Natural Landmark

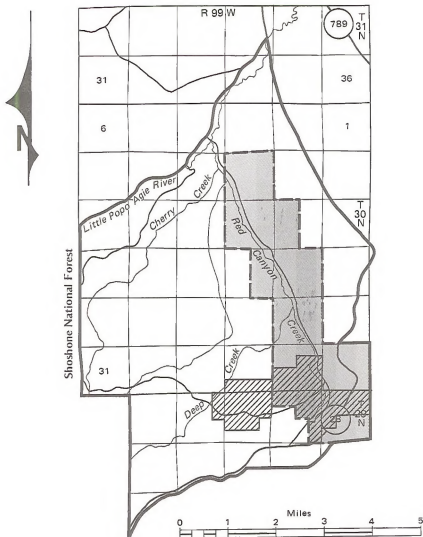
This national natural landmark was designated in 1976 (see map 3-40). Covering an area of over 5,700 acres, the Red Canyon National Natural Landmark is located along the southeastern flanks of the Wind River Mountains in Fremont County. It is primarily significant for its "classic dissected cuesta" characteristics. As the Wind River Mountains to the west were uplifted during the Laramide Orogeny some 60 million years ago, horizontal strata of Phosphoria Formation (dolomite, limestone, siltstone, sandstone, chert, and phosphorite), Chugwater Formation (shale, siltstone, and sandstone), and Nugget Formation (sandstone) were tilted eastward. Later, erosion in the area stripped off most of the material above these strata, leaving a valley of gentle sloping resistant Phosphoria Strata on the west, soft Chugwater deposits in the bottom, and a steep rim of nugget sandstone on the east. This situation of a valley with gentle slopes on one side bordered by steep slopes on the other is characteristic of cuesta development, and Red Canyon is a classic and scenic example of this type of geologic occurrence.

The area within the designated national natural landmark is composed of BLM, state, and private lands, and all but one landowner is signatory to agreements designed to protect the canyon's natural character. Therefore, the landmark is relatively safe from impacts and should continue to be an important geologic and scenic area.

## Beaver Rim Proposed National Natural Landmark

This proposed landmark covers an area of 1,120 acres and lies along the western end of the Beaver Divide in Fremont County. This area is considered significant for its well defined stratigraphic sequence of Tertiary deposits, which are exposed along the slopes of the rim. The proposed national natural landmark includes representative exposures of virtually complete Early Eocene Epoch through Miocene Epoch stratigraphic sequences. This complete sequence is very rarely exposed and is important to the understanding of Wyoming Tertiary geology. The area also is highly representative of the geological differences





Red Canyon National Natural Landmark

Wyoming Game and Fish Department  
Red Canyon Unit

Map 3-40  
National Natural Landmark  
Red Canyon

## Affected Environment

between the degrading Wind River Basin to the north and west and the more stable upland Sweetwater Plateau. The possibilities of exposed fossil materials and the stark scenic beauty of the area also add to the significance of this area. The National Park Service has recommended this proposed landmark for potential listing as a national natural landmark.

The proposed national natural landmark is composed entirely of public lands and is administered by the Bureau of Land Management. The proposed national natural landmark area is presently being managed for protection of its natural values.

### Dubois Badlands Proposed National Natural Landmark

This proposed landmark covers an area of 4,520 acres and lies along the Wind River near the town of Dubois, Wyoming. This area is considered significant primarily because of its unusual topographic features. Eroded pinnacles, spires, and flat-topped hills exhibiting slopes of colorfully banded shales are the most dominant features of this proposed landmark. The vegetation of the area has not been examined in depth, but may provide protected islands of pristine vegetation. The National Park Service has rated this ecological landmark candidate as 3-B, which means "Information lacking for a confident recommendation, but may prove nationally significant upon further investigation; site is in some danger." The proposed national natural landmark is completely composed of public lands administered by BLM. The area is presently being managed for protection of its natural values.

## SOCIOECONOMICS

### Introduction

Geographically, the Lander Resource Area encompasses the majority of Fremont County, Wyoming, and portions of Hot Springs, Sweetwater, Carbon, and Natrona counties. The resource area also includes the Wind River Indian Reservation, although BLM has no jurisdiction on those lands.

This section is designed to provide the baseline socioeconomic conditions for Fremont County and the major communities in the resource area. Those communities that are not expected to be impacted by any management actions proposed in this document will not be discussed. This includes those small portions of the adjacent counties.

### Fremont County

Fremont County's economy is diverse, but has its industrial base in agriculture, tourism, and mining. Although agriculture and tourism serve as the stable economic sectors, mining has experienced a high degree of instability in recent years. Table 3-24 provides a recent breakdown of the county's economy by sector.

Decreased mining and mining related industries include the complete closure of U.S. Steel's iron ore mine near Atlantic City in 1984 and the decline of uranium mining in the Gas Hills area, with the subsequent downturn in uranium refining in Jeffrey City.

Employment in Fremont County is projected to rise to almost 16,894 by 1986, from 15,604 in 1984. The Wyoming Employment Security Commission states that the labor force between October 1983 and October 1984 declined by 10.6 percent, and unemployment declined 43.2 percent (Volume 29, number 9, October 1984. Wyoming Labor Force Trends by the Wyoming Employment Security Commission). The corresponding unemployment rate dropped by 4.1 percent.

Population levels declined by over 7 percent from 1981 to 1984, mainly as a result of mine closures. Population projection by the Wyoming Department of Administrative and Fiscal Control place population at 37,750 by 1986, from 36,101 in 1984.

From 1976 to 1981, total personal income in the county rose by 120 percent. Most of this increase was directly or indirectly attributed to growth in the mining sector. Since 1981, however, personal income and employment levels in the county have dropped significantly, as have population levels. County population has dropped by 4.3 percent since 1981. These decreases have resulted mainly from slumps in minerals activity and mine closures. Future drops in population levels and personal income are anticipated as unemployment benefits become exhausted.

## Affected Environment

**TABLE 3-24**  
**FREMONT COUNTY LABOR ANALYSIS, 1983**

	Number Firms	Average Annual Covered Employment	Average Weekly Wage
Agriculture, Forestry, & Fisheries	28	89	\$166.66
Mining	82	2,008	\$510.47
Construction	189	971	\$348.84
Manufacturing	41	560	\$290.91
Transportation, Communi- cation, & Utilities	79	701	\$375.52
Wholesale Trade	78	553	\$319.72
Retail Trade	292	2,413	\$185.90
Finance, Insurance, Real Estate	75	417	\$267.27
Services	341	4,569	\$288.63
Public Administration	28	704	\$308.38
<b>Total</b>		<b>12,985</b>	
<b>Average of All Industries</b>			<b>\$314.02</b>

Source: Wyoming Annual Planning Report, Fiscal Year 1985, by Wyoming Employment Security Commission, Research and Analysis Section, Nov. 1984.

As a counter measure, the county and area communities are trying to promote growth in tourism and clean industry. However, the economic outlook, according to area planners, it not favorable.

There are six major communities in Fremont County in which the majority of the populus reside. A brief discussion of the major communities follows.

### Lander

Lander serves as the county seat for Fremont County. The town's diverse economy ranges from agriculture and tourism to mining.

Over the past year, layoffs in the mining sector have posed significant economic problems in Lander. The Atlantic City Iron Ore Mine ceased production in October 1983, resulting in the loss of approximately 580 jobs. Although these job losses are considered permanent, many of the unemployed have been reluctant to leave Lander. This has delayed the adverse effects that job losses

could have on the housing market. However, as unemployment compensation is exhausted, oversupply of housing could result with a subsequent increase in loan defaults and a decrease in housing prices. At the end of 1983, 3 percent of single-family housing in Lander was vacant or for sale. Present estimates by local planners indicate that in a worst-case situation, the vacancy rate could increase to 10 to 15 percent by 1985. Worst-case estimates by area planners show population declines of 10 percent in Lander over the next 2 years. These estimates include entire families and are based on the number of employees who lost jobs in the iron ore mine.

Lander has adequate educational facilities with three elementary schools, one junior high, and one high school. Central Wyoming College also has an extension center located in Lander.

Other community services in Lander include a 107-bed hospital, the Wyoming State Training School (a 27-bed psychiatric and chemical dependency hospital), a substance abuse center, four clinics, and one nursing home. Forty doctors

## Affected Environment

and eight dentists also practice in Lander, and ambulance service is provided. Police and fire protection is also deemed adequate.

Recreational facilities range from 120 acres of city parks to baseball diamonds, tennis courts, and various indoor athletic facilities. Transportation services include charter air service at the local airport and bus service.

All municipal services are adequate for the present population, with a margin upwards of 1,000 persons.

### Dubois

Nestled in a valley between the Wind River and Absaroka mountains, on the Wind River, Dubois offers some of the finest wilderness and recreational areas in the West. It serves as the gateway to the Yellowstone and Grand Teton National parks.

The Dubois economy is dominated by agriculture, timber and tourism. Tourism, including outfitting activities, is estimated to produce at least 50 percent of total local income. In itself, outfitting and its related business activities account for roughly 25 percent of total local income. Almost all of the local outfitters also work at other occupations such as ranching and timber related businesses. Timber and ranching activities jointly account for 50 percent or less of total local income. With the exception of the timber industry, which fluctuates with the housing and construction industries, Dubois has a rather stable economy.

Total population for the city was estimated at 1,100 in 1982, with an annual growth rate of slightly over 5 percent. At least 15 percent of the local residents are retired and not anxious for additional local economic growth. However, most local businessmen would like to see orderly growth in tourism and light, clean industry. In general, the community favors a relaxed lifestyle and wants to avoid boom-town impacts.

The cost of living is estimated to be comparable to that in Riverton and Lander for the majority of items. However, some residents indicated that housing costs were relatively high because income levels and demand for housing by retired persons moving to, or residing in, the area forced these prices upward.

Most major services are sought in Riverton or Lander; however, Dubois does have limited shopping. The school system has one elementary school and one facility for both junior high and

high school students. These facilities are adequate for present population levels. Other community and municipal services are deemed satisfactory, as is the housing situation.

### Riverton

The city of Riverton is located in central Fremont County on the Wind River Indian Reservation. Both the Owl Creek Mountains to the north and the Wind River Mountains to the west are visible from the city.

Before the uranium development of the mid-1970s southeast of Riverton, life revolved around serving as a commercial center for the adjacent Indian reservation and the farms and ranches along the Wind River. The community was essentially sustained by an agricultural base, and population growth was stable. The town has always served tourists passing through on their way to the national parks. During the 1970s, Riverton began to grow and modern services sprang up along the strip north of town alongside Wyoming Route 26. Many citizens resisted the new facilities to accommodate mining growth and the expanded economic opportunities were not welcomed by many of the townspeople. Since the almost total collapse of the uranium mining industry in 1981, this attitude probably was helpful in limiting growth of services and facilities so that Riverton never "over-built." The unemployment rate is the highest in 10 years. Riverton, having assimilated mining personnel on its own terms, can (and has) integrated these people into the community with a lessening of tensions between mining newcomers and long-time residents.

Riverton provides most of its own merchandising needs and that of the surrounding population. There is oil and gas production on the Wind River Indian Reservation, and many of the Arapahoe and Shoshone are viable customers for the town merchants. Jade is found almost singularly in the United States in Fremont County, and this specialty jewelry business is a special feature of commerce in Lander and Riverton.

With minor exceptions, most community facilities and services and utility systems are adequate to meet present and future needs. These assessments include housing and educational systems.

Other major communities in Fremont County are not expected to be adversely affected by actions proposed in this Resource Management Plan; thus, they will not be discussed further.

### Regional Economic Baseline

Economic activity in this area is not limited to geographic boundaries, but it can have effects elsewhere in the surrounding counties.

For the purpose of this document, the regional economy is defined as Fremont, Carbon and Albany counties. This defined area follows fairly closely to the Rawlins BLM District boundaries. The industrial sectors characteristic of this three-county area have been modeled in the Rawlins District Input-Output Economic Model designed by Colorado State University.

The main industrial sectors are shown in table 3-25, along with the corresponding final demand figures (shown in dollars of output).

**TABLE 3-25**  
**FREMONT COUNTY**  
**LABOR FORCE TRENDS**

Fremont County	October 1984	October 1983	Percent Change
Labor force	18,299	20,473	-10.6
Unemployment	1,317	2,320	-43.2
Unemployment rate	7.2	11.3	-4.1

Source: *Wyoming Labor Force Trends*, Vol. 21, No. 9, Oct. 1984. Wyoming Employment Security Commission, Casper.

### Social Conditions

Social conditions in Fremont County appear to hinge on several factors; however, unemployment seems to be the basic one. Crime, family problems, alcoholism, and other social maladies all seem to stem from the lack of employment. Although unemployment in the county fluctuates, it topped 10 percent in 1983. Employment statistics are shown in table 3-24.

Although unemployment from mine closures has been significant, many people have remained in Fremont County, resulting in a less than purported decrease in population levels. Reasons for remaining in the area are not clear; however, unemployment compensation is probably a major factor. When it is exhausted, population levels are expected to drop.

Demographic statistics indicate that by 1986, 50 percent of the population will be in the 23- to 64-year age group, with about 8 percent over 64. This shows a slightly older population than the area had in the early 1980s.

According to the Wyoming Division of Criminal Identification, Fremont County in 1982 had 2.3 officers per 1,000 population, and the index of crimes per officer was 17.2. Comparative state figures were 2.4 officers and 21.2 crimes per officer. In major Fremont County communities in 1982, the number of officers per 1,000 of the population ranged from 2.0 in Riverton to 4.5 in Shoshone. The related index of crimes per officer was highest in Riverton, and lowest in Shoshoni.

Fremont County had a slight decrease in the incidence of crime between 1982 and 1983. In addition, crime in the first quarter of 1984 was down over 30 percent from crime in the comparable 1983 quarter. The county crime rate per 10,000 inhabitants in 1982 was substantially lower than the relative state crime rate that year. Burglary, larceny and motor vehicle theft accounted for the majority of county crimes.

Among major county communities in 1982, Shoshoni had the lowest crime rate per 10,000 of the population and Lander the highest. Between the first quarters of 1983 and 1984, Shoshoni had the greatest percentage crime increase and Dubois the greatest decrease. However, percentage figures can give an exaggerated view of crime changes in such small communities because of the relatively low, actual crime base from which such percentages are figured. A better relative crime indicator is the crime rate per 10,000 of the population.

The majority of arrests in Fremont County were related to drinking, liquor-law violations, and disorderly conduct. Thefts and burglaries were the next most common crimes resulting in arrests. There was also a relatively high portion of drug related arrests. Juvenile arrests in the county were mostly for thefts and liquor-law violations. Arrest patterns related to given crimes were about the same in major county communities as for the county.

### Minerals

#### Oil and Gas

Fremont County's market share of Wyoming's oil and natural gas production over the past 10 years has averaged 5 percent and 16 percent.



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Historical production trends are shown in figures 3-7 and 3-8. In 1982, the county ranked eighth in oil production and second in natural gas production in the state (DEPAD 1983).

### Employment and Earnings

Since 1979, employment has increased by 10 percent (1983). Earnings increased by 30 percent during the same period. As of 1983, 961 persons were employed in the oil and gas industry, with total earnings of \$24 million. Employment has fluctuated considerably since 1979, with 1981 being the peak year (1,315 persons).

### Drilling Activity

Drilling activity has taken place in the resource area since 1884, when the first oil well west of the Mississippi was drilled. Activity has since progressed at various rates throughout the area and has eventually led to the establishment of highly productive oil and gas fields. According to data compiled by Petroleum Information Corporation (PI), there are approximately 2,436 wells within the confines of the resource area, excluding those on the Wind River Indian Reservation.

To determine growth rates in drilling activity and success rates, the resource area was categorized into areas of high, moderate and low oil and gas production potential areas. These areas were then evaluated using the PI data to establish annual drilling activity and whether the well produced or not. Figures 3-9, 3-10 and 3-11 show the historical levels of drilling activity by productive potential areas with annual growth rates of 1.5 percent for high, -14 percent for moderate, and -58 percent for low. These growth rates were calculated using linear regression analyses techniques over a 34-year period.

Historical success rates by area are shown in figures 3-1, 3-2, and 3-3. In the high production potential area, success rates averaged 65 percent; the moderate areas, 10 percent; the low areas, 4 percent. Additionally, a statistically significant correlation was found to occur among levels of drilling activity and success rates in the high-production potential areas. In the moderate and low areas, the correlation was not statistically significant.

The growth rates in drilling activity are sensitive to the national economy. Therefore, the rates shown in this analysis are designed to provide a planning horizon to estimate drilling activity in early production potential areas.

## Uranium

Over the past several decades, uranium has become an important commodity to the economy of Wyoming and Fremont County. Uranium from Fremont County reserves have been used primarily for electricity generation. Since 1971, this market has been the predominant use for domestically-produced uranium. None of the uranium produced from Fremont County mines has been exported.

### Production

Uranium production in the United States declined during 1983 to 19,579 tons, continuing the trend of decreasing annual production that began in 1981. Production levels in 1983 were nearly 52 percent less than the record annual production of 21,852 tons of  $U_3O_8$  (DOE 1984).

Wyoming's uranium production showed a steady increase from 1974 to 1978, leveled off for several years, then began decreasing to current levels. Uranium production in Fremont County accounted for 38 percent of the state's production during the peak year, 1980. Levels in 1983 are just slightly higher than 1974 levels. Currently, the uranium mines in Fremont County are producing at very low levels, if at all.

According to Department of Energy (DOE) information sources, the major reasons for production declines are based on current market demands and existing inventories. As it became certain that optimistic projections of rapid growth for nuclear power would not be realized, the utility companies, which had contracted for much of their uranium supplies, found themselves faced with increasing inventories of uranium for which they had no immediate use. This buildup of nuclear fuel inventories has become a major factor in the uranium supply/demand balance. DOE estimates indicate that the total uranium inventory owned by utilities at the end of 1982 represented 4 years of forward coverage, assuming an average annual requirement of 17,000 tons of  $U_3O_8$  (DOE 1984).

Trends in the near future indicate that additional inventory supplements will be met by cheaper imports, as happened in 1981, 1982 and 1983. During the next few years, the projected demand and market price for new contracts will be too low to encourage expansion of domestic production capacity, which is projected to decline by 1985 to a level of between 6,000 and 9,500 tons per year before it slowly recovers in the following

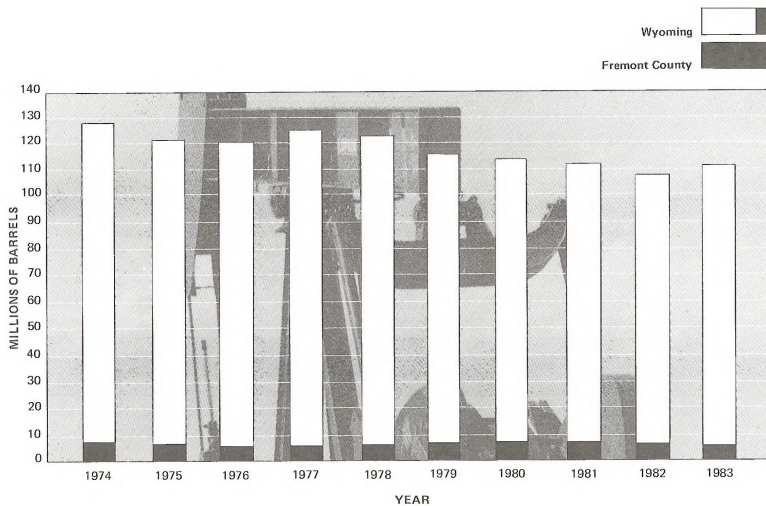


Figure 3-7  
Oil Production



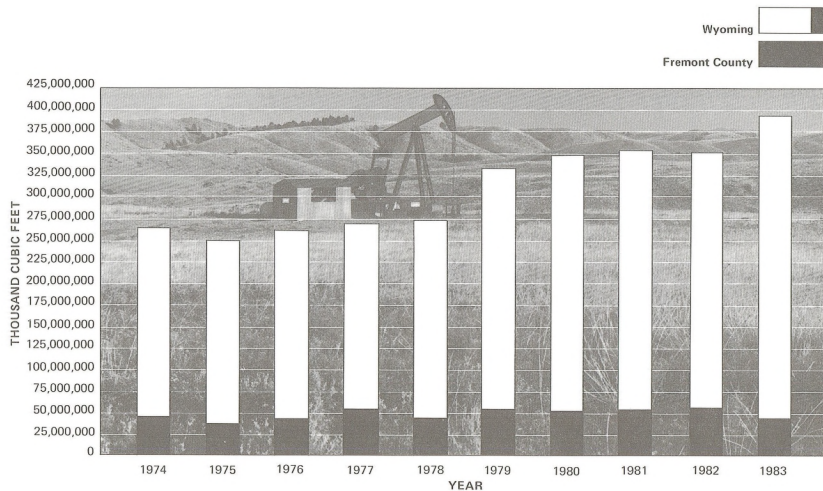


Figure 3-8  
Natural Gas Production

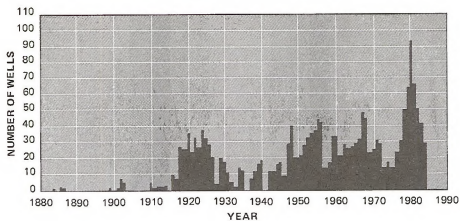


Figure 3-9  
High Production Potential Areas for Oil & Gas-  
Drilling Activity

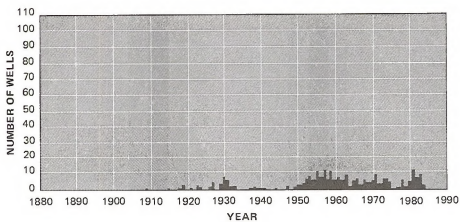


Figure 3-10  
Moderate Production Potential Areas for Oil & Gas-  
Drilling Activity

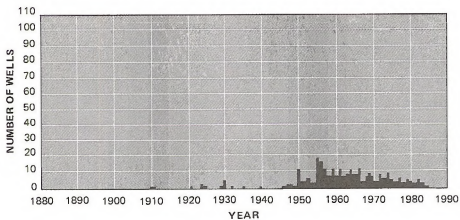


Figure 3-11  
Low Production Potential Areas for Oil & Gas-  
Drilling Activity

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years, reaching a range of 7,600 to 12,000 tons per year by 1990. The recovery is slow despite an increase in projected domestic requirements, because the cost of domestic production continues to increase, eroding the competitive position of U.S. producers in the world market. For example, the ore grades processed domestically in the early 1970s were about 0.2 percent uranium, whereas those processed (and likely to be processed) in the 1980s are around 0.1 percent uranium. This implies a significant increase in the average production cost. Additional cost factors are the increasing depths of the domestic deposits being mined and, more importantly, the increasingly stringent environmental regulations imposed on producers by both state and federal agencies. Domestic production is projected to increase steadily through the 1990s, as the market price begins to rise. Some recovery in production is projected even during the first half of the 1990s, when the market price remains constant, because of the steady growth of domestic requirements and the beginning of an increase in foreign requirements.

Figure 3-12 shows historical uranium production levels for Wyoming and Fremont County.

### Employment and Earnings

From 1979 to 1983, employment has declined dramatically from 2,388 persons to 539 (-77.43 percent). Earnings during the same period decreased by 71 percent. To date, very few persons are employed in the uranium industry in Fremont County.

### Phosphates

Hardrock mining for phosphates began in the mid 1800s when alternative sources for the fertilizer component were needed. Domestic production came mainly from the East Coast, until reserves were located in the Western states. In 1978, 87 percent of the domestic production was used for fertilizer and animal feed supplements. The balance was used for industrial and food-grade products and exporting.

Phosphate mining in Wyoming has been limited to Lincoln County in western Wyoming. Production from this area has ceased.

The domestic phosphate market is expected to continue at current levels until the eastern reserves are depleted. The reserves of oxidized phosphate rock in Idaho and deposits in Utah, Montana and

Wyoming will be mined, but at a slower rate to meet the demands for elemental phosphorus and the market where products can compete. The problem of assuring adequate supplies of phosphate fertilizer to meet the demand of agriculture will be a serious consideration in the next century.

The demand for phosphate rock and phosphatic fertilizer was weak in both domestic and export markets. Domestic demand was weakened in 1983 by implementation of the government's payment-in-kind program and by the recession in the agribusiness sector. Exports of phosphate fertilizers and grain were less than anticipated because of competition from foreign producers of both commodities.

Domestic supplies of phosphate rock were more than adequate to meet all demand elements. Underutilized phosphate rock capacity and large inventories coupled with weak demand caused several domestic phosphate rock mines and conversion plants to close. The capability of domestic producers to compete with subsidized government-controlled foreign mines was reduced, selling prices declined to unprofitable levels, and investment in high-cost replacement mines in the United States was deferred.

From a 1982 base, demand for phosphate rock is expected to increase at an annual rate of about 2 percent through 1990. It is estimated that in 1984 domestic mine production of phosphate rock will be 41 million tons and U.S. apparent consumption will be 32 million tons (Bureau of Mines 1984).

### Bentonite

Wyoming's bentonite mining and refining industry has recently gone through some very hard times and is slowly recovering. Bentonite production fell 37 percent from 1981 to 1982, and declined another 1 million tons, or about 35 percent, from 1982 to 1983. This was coupled with a price reduction to around one-third of the 1981 market price for all types of bentonite products. No bentonite operation in Wyoming, which supplies about 90 percent of all domestic bentonite, has closed.

Based on 1982 figures, bentonite is used primarily for drilling mud (51 percent), taconite (iron ore) pelletizing (15 percent), foundry castings (12 percent), other minor uses (9 percent), and exports (13 percent). It is apparent that the dramatic decline in oil well drilling, the oversupply of taconite for steel making, and the reduction of factory orders for foundry products combined

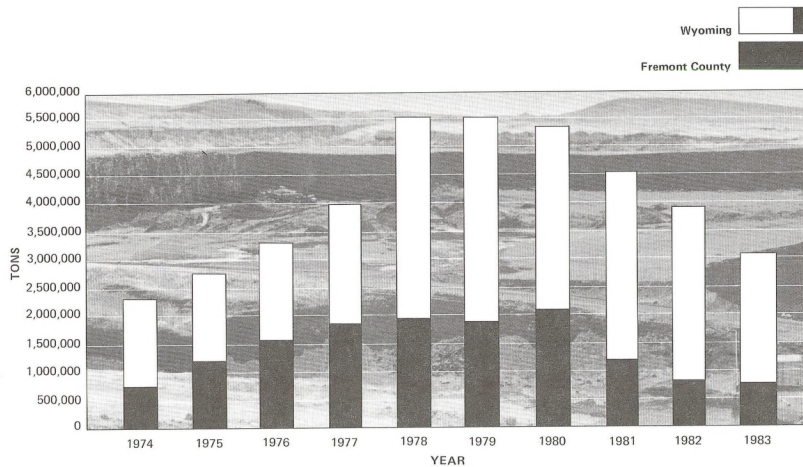


Figure 3-12  
Uranium Production

## Affected Environment

during the 1982 recession to reduce the total bentonite market by almost 78 percent. Drilling and steel making have carried the bentonite industry for the last 2 years.

Since December 1983, orders for bentonite for taconite pelletizing and foundry castings have continued to increase. At the same time, the demand for oil well drilling mud has increased only slightly. Based on these conditions, bentonite production is expected to increase slowly through 1984. In the next 5 years, bentonite production should continue to increase, though not so dramatically as it did before 1981. A dramatic increase in production is not expected unless oil well drilling increases substantially—an event not presently forecast.

Regarding future markets for bentonite, because of its low permeability and ion-exchange capacities, bentonite could work both as a sealant and an absorbant in the isolation and containment of some types of hazardous wastes. It is currently being investigated for use in the reclamation of the contaminated area near the old Union Pacific tie treatment plant in Laramie (Institute for Policy Research 1984).

The employment and income figures associated with bentonite production is unavailable because it is aggregated into the general mining sector.

### Zeolites

Zeolites have many potential uses in industry and agriculture. If the production of natural zeolites became more economical than the manufacture of synthetic zeolites, Wyoming might have a new industry. Important zeolite reserves are present southeast of Rock Springs and in the Beaver Rim area east of Lander and Riverton.

Rocky Mountain Energy and the Industrial Mineral and Chemical Company plan to mine several thousand tons of zeolite-bearing ore and ship it to research laboratories in Illinois. The laboratories will test the material for potential uses, including water softening applications and applications related to its absorption properties. In addition to water softeners, the product may be useful in kitty litter and feedlot deodorizers (Institute for Policy Research 1974).

Specific employment and income levels for zeolite mining are unavailable.

### Iron Ore

During 1983, the iron ore industry in the United States continued to operate at less than half of its production capacity. Most major mines were closed for part of the year; one taconite mine and pelletizing plant was closed permanently, and output capacity of another plant was reduced. U.S. production capacity for pellets declined by about 3 percent, to approximately 85 million tons per year. Published prices and freight rates were mostly unchanged from 1982 levels, but some rail and dock charges continued to edge upward. The industry continued to face problems of excess capacity, rising costs of production and transport, nearly static productivity, and declining markets, most of which reflected similar problems in the domestic iron and steel industry. Major effects to reduce costs and improve productivity were expected to result in closure of additional mines and ore-processing plants.

From a 1981 base, demand for iron ore is expected to decline at an annual rate of 0.3 percent through 1990. It is estimated that in 1984, domestic production of iron ore will be 50 million tons and U.S. apparent consumption will be 68 million tons.

Environmental aspects of the iron ore industry mainly concerned reclamation of process water and plant tailings, reduction of dust and noise, control of groundshock from blasting, and disposal of solid waste. New technological research included addition of magnesia to iron ore pellets to improve blast furnace productivity and direct smelting of iron ore using a plasma reduction process.

In Wyoming, Fremont County's iron ore mine in Atlantic City closed production permanently in October 1983. Historical production levels are shown in figure 3-13. As confidential information would be disclosed, no preuse employment and earnings information is available. Although the mine is closed, the future status of the operation is questionable. However, it appears that the shut-down is permanent.

### Visitor Use and Recreation

The following information regarding recreational expenditures and usage was compiled from the Institute for Policy Research in Laramie,

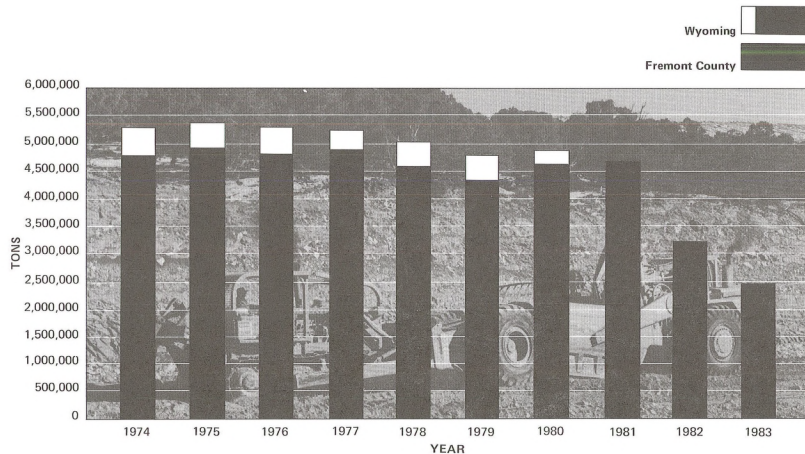


Figure 3-13  
Iron Ore Production



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Wyoming. Their usage figures encompass central Wyoming, which includes all of Fremont County, in addition to Natrona, Converse, Niobrara, Platte, and Goshen counties. Because of this, estimates on visitors use and recreational expenditures will be higher than for Fremont County alone.

The Oregon/Mormon Trail is particularly prominent in the region, including a variety of historical markers, museums and trail sites. The trail exists at its present site because of its proximity to the North Platte and Sweetwater rivers, and because of its natural, gradual grade to the "shining mountains" at South Pass. During the 27-year period of mass emigration beginning in 1841, the Oregon/Mormon Trail was known by many names, including the "California Road," the "Mormon Trail" and the "Great Platte River Road."

The Wind River Indian Reservation, located in west-central Wyoming, is an important part of the culture and economy of Fremont County. For the most part, members of the Shoshone tribe occupy the south-central, western, and northern portions of the reservation, while members of the Arapahoe tribe live mainly in the southeastern portions in the towns of Ethete, Arapahoe, and St. Stephens.

The main tourist attractions on the reservation are the annual pow-wows held at Fort Washakie, Crowheart, Ethete, and Arapahoe. In addition, the grave of Sacajawea, guide for the Lewis and Clark expedition, is located west of Fort Washakie, and the grave of Chief Washakie is located in the old military cemetery along the Wind River, directly behind the agency.

Portions of the Shoshone National Forest also are located in the region. The Washakie Wilderness Area, composed of what formerly had been the South Absaroka Wilderness and Stratified Primitive Area, is located north of Dubois in the volcanically formed Absaroka Mountains. Noted for its rugged terrain, the Washakie Wilderness is also known for its large collections of petrified woods.

The Fitzpatrick Wilderness Area is located in Wyoming's true "high country." Along the ridges of the Continental Divide, clustered near 13,804-foot Gannett Peak, are the seven largest glaciers in the United States outside of Alaska. The 175,000-acre Fitzpatrick Wilderness Area is renowned for its many alpine lakes and excellent trout fishing.

The smallest of Wyoming's wilderness-type areas—the 70,000-acre Popo Agie Primitive Area—is also located in the region. The area contains over 100 lakes and is characterized by its extremely rugged terrain.

Total travel expenditures in the six-county area, which makes up the central Wyoming region, amounted to \$194,682 in 1981, according to U.S. Travel Data Center figures. The total travel-generated payroll during the same period for the region was \$38,996, accounting for a total of 5,157 jobs.

## Wildlife

Wildlife revenues accrue as local expenditures to communities made by hunters and anglers for licenses, guide services, hunting, fishing and camping equipment, ammunition, transportation needs, lodging, food, etc. These expenditures constitute a large portion of personal revenues in Dubois, Lander, Shoshoni, Riverton, and other communities in the vicinity of game areas, lakes, wilderness areas, etc. Consumptive values in the resource area were approximately 6 million dollars in 1983. Nonconsumptive values, those associated with viewing wildlife, aesthetics, etc., although difficult to measure, account for a large percentage of the economic and social value of wildlife. When combined with the scenic and wilderness values in the Fremont County area, nonconsumptive values of wildlife may be quite significant.

Several important wildlife areas are located in the vicinity of Dubois, in the northern portion of the resource area. Both East Fork and Whiskey Mountain contain large herds of wintering elk, deer and bighorn sheep. These areas, primarily because of the sheep herds, have national significance. Not only is the herd used as transplant stock, hunters and sightseers come from many parts of the nation and world to view or hunt the sheep.

Because of the popularity of Dubois' big game herds, a significant percentage of the population of Dubois benefits from providing guide services into game areas. Current figures indicate that approximately 6 percent of the population of Dubois depends directly on the viability of these big game species to provide for all or a portion of their income (BLM 1984).

## Timber Resources

Timber resources in Fremont County contribute to the economic base by providing employment, income and revenues. The economic contri-



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butions of timber range from commercial timber cutting for house logs and lumber to fuelwood cutting for residential use.

BLM lands provide forest products to meet a portion of this demand. Past cutting activities have been evident for many years.

In 1983, Fremont County's employment in mills and timber operations was down to 147 persons, a 51 percent decrease from 1977. However, employment was up from 1982 levels by 6 percent. Personal income associated with logging and wood products in 1983 was \$613,000. Although total revenues associated with these commodities is difficult to track accurately, state tax revenues from mining machinery and sawmills exceeded 3 million dollars in 1984.

### Commercial Timber Sales

The economic value of Lander BLM timber varies by species and location. Most of the commercial demand is for house logs and sawlogs.

Figure 3-14 shows historical trends in commercial timber sales since 1976 in the Lander Resource Area on BLM lands.

Although the pattern reveals a downward trend, commercial timber demand is very sensitive to the national economy, making an accurate local forecast difficult.

### Post, Pole and Firewood Sales

Demand for these products are shown in figure 3-15 and figure 3-16. Although the demand for posts and poles is expected to remain relatively constant, fuelwood demand is expected to increase.

Fuelwood cutting benefits not only are evident in reducing residential energy costs, but also in recreational benefits. The recreational benefits are mainly unquantifiable, but contribute significantly to the economic value of fuelwood.

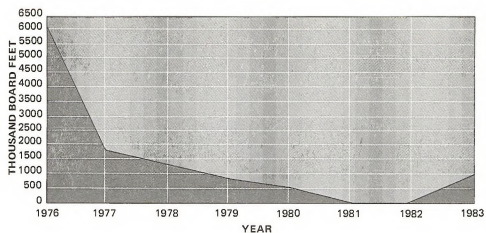


Figure 3-14  
Lander Resource Area  
Timber Sales

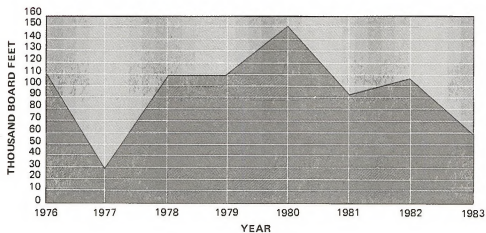


Figure 3-15  
Lander Resource Area  
Post & Pole Sales

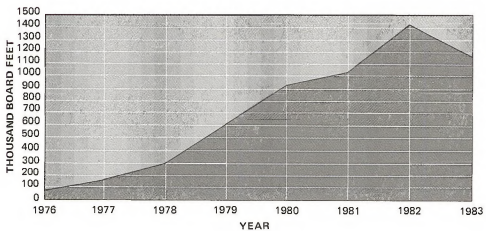
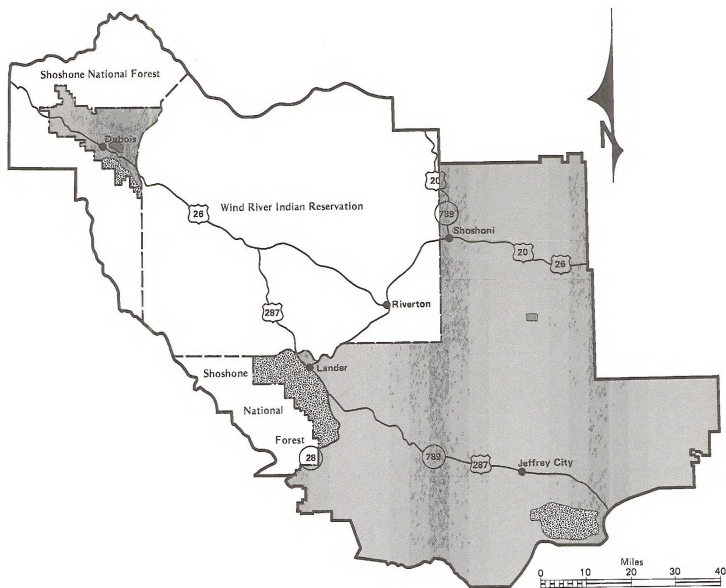





Figure 3-16  
Lander Resource Area  
Fuelwood Sales



-  Existing Roads and Trails
-  Designated Roads and Trails  
(Green Mountain, Lander Slope, Whiskey Mountain)
-  Closed ( Castle Gardens; Dubois Badlands)

Note: Red Canyon Elk Winter Range is closed to over Snow Vehicles.

Map 3-32  
ORV Designations  
Lander Resource Area



Existing Access Easements

- A Fort Stambaugh Loop 2324
- B Hudson-Atlantic City 2302
- C Three Forks-Atlantic City 2317
- D Green Mountain Loop 2411
- E Cedar Rim 2301
- F Agate Flats 2404
- G Castle Gardens 2107
- H Cyclone Ridge 3216
- I Red Creek 3219
- J Bison Basin-Hadsell Crossing 3221
- K Copper Mountain 2113
- L Oil Springs 2305

Proposed Access Easement Negotiations

- 1 Beaver Rim 2401
- 2 Crooks Mountain 2409
- 3 Mormon Basin 2202
- 4 Government Draw 2304
- 5 Signor Ridge
- 6 Taggart Meadows
- 7 Hudson-Atlantic City 2302
- 8 Copper Mountain 2113
- 9 Willow Creek 2412
- 10 Beef Gap
- 11 Wolf Gap
- 12 East Beaver
- 13 Tappan Creek
- 14 Dilabaugh Butte 2315

Map 3-33  
Access  
Lander Resource Area

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## CHAPTER IV

# ENVIRONMENTAL CONSEQUENCES

## INTRODUCTION

This chapter presents the environmental consequences of the four alternatives. The first part of the chapter addresses the assumptions used in developing the environmental consequences. The next part of the chapter discusses the impacts common to all of the alternatives, and the last part of the chapter addresses the impacts by each alternative.

## Assumptions

The following assumptions were used for the development of the environmental consequences presented in this chapter.

### Oil and Gas

Oil and gas drilling would continue at about a 1.5 percent average annual growth rate for at least 60 years.

Geophysical exploration would continue to be active and widespread throughout most of the resource area, with many areas continuing to be explored over and over again by different companies and different methods.

Geophysical companies would continue to use drilling rigs (truck and portable), helicopters, surface shot, and shot hole blasting to a large extent in their operations.

Based on limited information and knowledge of past performances, approximately one-third of the wildlife habitats lost in the next 60 years, as a result of oil and gas activities, would be restored to habitat of equal or greater value (Fowler and Witt 1985).

Unless withdrawn from leasing, even areas currently considered low or with no potential for oil and gas would be subject to leasing, some exploration and limited development. Also, the oil and gas potential ratings for some areas would be upgraded to high or moderate as a result of new information.

## Phosphates and Locatable Minerals

Since varying market conditions drastically affect the feasibility of serious exploration and mining and many locatable mineral claims are already in existence, any of these known mineral resources might be subject to development.

## Off-Road Vehicles (ORVs)

Management actions for ORVs would be effective in controlling ORV use by creating a high level of public acceptance and an adequate level of enforcement of restrictions.

## Impacts Common to All Alternatives

### Energy and Minerals

#### Introduction

Management actions discussed in this resource management plan would actually cause very few direct impacts to energy and mineral resources themselves. Management actions that would restrict or prohibit the development of a mineral resource would not actually impact the resource. Management actions that would allow development of a mineral resource would impact that resource only in that once it has been developed, it is gone forever; minerals are not renewable resources. Since the actual impacts to energy and minerals are so few, this environmental consequences section centers on the impacts to exploration and development of mineral resources, in terms of availability of those resources and efficiency of operations.

Management actions that would cause significant adverse impacts on the recovery of energy and mineral resources are those that restrict or prohibit prospecting, exploration or development. Those actions that would cause significant beneficial impacts on the recovery of energy and mineral resources are those that would

## Environmental Consequences

eliminate or limit restrictions on mineral exploration and development, and those actions that would open prospectively valuable mineral lands to exploration and development.

Management actions that would not have significant impacts are: 1) the maintenance of existing fish and wildlife habitat improvement projects, 2) forest management actions, 3) the placement of utility systems, 4) management actions for recreation, and 5) unrestricted vehicle access.

Many lands within the Lander Resource Area have unknown mineral potential. Specific impacts cannot be determined for lands with unknown mineral potential. However, management actions that would restrict or prohibit prospecting, exploration or development on these lands would limit or preclude the opportunity to determine the mineral potential of these lands.

### Seasonal Restrictions

Leasing of public lands with seasonal restrictions, that is, restrictions closing or limiting operations during certain months, would adversely affect oil and gas exploration and development activities. Seasonal closures temporarily exclude lands from all exploration operations. The timely and most efficient exploration and development for oil and gas are hindered by short-drilling seasons. Generally, wildcat wells to be drilled 15,000 feet deep or more cannot be drilled in the 4 to 7 months the lands would be open. If drilling operations could not be finished and a well completed for production before the closure period starts, the operator would have to request an extension of time from the BLM or cease operations until the restricted period has ended. Such options create delays, excessive costs and ultimately the inefficient development of valuable energy resources and the loss of royalty revenues. If a well were completed in the open season, the well could be produced but any further drilling of off-set wells to expand a newly discovered or existing field would not be allowed until the next open drilling season. Such delays would be costly as payout times for operating costs would be extended and there could be a short-term loss of revenues to the government, which might be recaptured over the life of the field.

### No-Surface Occupancy Restrictions

No-surface occupancy restrictions in the Lander Resource Area fall into two categories; 1)

restrictions that are required by statewide standard stipulations, which generally cover small areas across the entire resource area, and 2) larger acreage, site-specific restrictions. The first type of restriction is designed to protect steep slopes (25 percent or greater), riparian areas, significant cultural and historical resources, developed recreation sites, important visual resource areas, National Natural Landmarks, important wildlife habitat, and other significant surface resources. Such restrictions generally would not create significant impacts to oil and gas development. Area-wide restrictions are the same restrictions as described above, only they cover enough acreage to hinder or possibly preclude oil and gas development within that acreage.

In the Lander Resource Area, approximately 650,000 acres are subject to no-surface occupancy restrictions included in statewide standard stipulations. Although the acreage is large, the restrictions are not expected to significantly affect the amount of oil and gas available for development. There are several reasons for this. One reason is that no-surface occupancy areas are often small enough that a proposed well location could be moved without hindering the recovery of the oil and gas resource. A second reason is that some restrictions are discretionary and may be altered by the BLM. For example, restrictions prohibiting surface disturbing activities within 500 feet of surface water or riparian areas may include intermittent and ephemeral streams or may be limited to perennial streams. Some restrictions may be waived if the the lessee and the BLM develop an acceptable plan for mitigating anticipated impacts. Another reason is that much of the acreage is in areas with low or no potential for the occurrence of oil and gas where the amount of exploration activity would probably be small.

The remaining 65,000 acres of the no-surface occupancy restrictions are attributable to the larger acreage site-specific. The restrictions would cover areas such as the Oregon/Mormon Trail corridor, the area previously designated as the Dubois Badlands Wilderness Study Area, the proposed South Pass National Historic Mining District, and Beaver Rim. They also would cover the Lander Slope and Red Canyon Management Units, where such a large portion of each unit would be under no-surface occupancy restrictions, due to statewide standard stipulations that essentially all of each unit would be unavailable for oil and gas development.

Due to the large distance that most proposed well sites would have to be moved to avoid area-

## Environmental Consequences

wide no-surface occupancy restrictions, most wells in these areas would have to be directionally drilled. Directional drilling is not as efficient as vertical drilling, is expensive, and has many limitations. The distance that a well site can be moved varies with the type of geologic structure and with the depth to the producible horizon. Area-wide no-surface occupancy restrictions could cause inefficient development of oil and gas reserves. Some reservoirs could not be reached and developed, causing loss of revenues to the lessee and the United States. In addition, geophysical operations that are necessary in discovering subsurface oil and gas traps could be precluded.

### Soil, Water and Air Quality

The environmental consequences of the alternatives in this section for soil, water and air resources are generally similar in nature, but vary in degree of significance. A description of the similar impacts from each of the alternatives is given for the oil and gas, uranium and other locatable minerals, gold, phosphate, livestock grazing, fish and wildlife, forest management, landownership adjustments, utility systems, recreation, ORVs, and fire management programs. Management programs not expected to significantly impact soil, water and air resources are: access, coal, and cultural resources/natural history.

There would be certain impacts common to all alternatives that affect soil, watershed, and air quality. Soil compaction and accelerated wind and water erosion would occur for all alternatives, where management actions recommend oil and gas exploration or development, exploration and development of locatable minerals, fire suppression with heavy equipment, livestock grazing, and ORV use. Soil compaction and accelerated wind and water erosion might result in reduced site productivity and increased sedimentation, depending on the nature and extent of management actions recommended by alternative and certain unpredictable natural phenomena, e.g., climate, biological activity. The predictable significance and extent of each impact will be discussed by alternative.

For all alternatives under the discussion of impacts from oil and gas activities, the concentration and magnitude of surface disturbance would depend, in part, on the products produced from individual fields, e.g., oil, gas, and/or condensate, and well depth. Adequate field investigations, before, during and after reclamation plan development would help mitigate most impacts.

## Fish and Wildlife

### Introduction

Management actions for oil and gas leasing, development and exploration, phosphate prospecting, leasing and development, locatable mineral exploration and development, fish and wildlife habitat enhancement, forestry, landownership adjustments and utility systems, recreation, off-road vehicles, fire management, and access could cause adverse or beneficial effects on fish and wildlife resources.

Management activities for cultural resources or recreation would not significantly affect fish and wildlife resources anywhere in the resource area, with the exception of winter recreation management in the Red Canyon Management Unit. No management actions for landownership adjustments under consideration in the South Pass, Green Mountain, and Red Canyon Management Units would significantly affect fish and wildlife resources. Access management actions in the Red Canyon, South Pass, East Fork, Whiskey Mountain, Dubois Badlands, and Dubois Area Management Units would not significantly affect fish and wildlife resources. Major livestock and wild horse grazing management decisions have already been made in the Green Mountain, Beaver Creek, South Pass, Red Canyon and Lander Slope Management areas as a result of the recent Green Mountain Grazing Environmental Impact Statement and Range Program Summary. The nonimpacting actions indicated in the above management units will not be discussed further, in relation to effects on fish and wildlife resources, in this document.

### Management Actions for Oil and Gas

The oil and gas industry, which is primarily a rural land user, has been operating in the resource area for approximately one-hundred years. In regions such as the Lander Resource Area, activities involving the search for production and transportation of oil and gas resources continue to be widespread. Over time, the industry has brought in large numbers of people and new technology, which has changed and expanded the realm of human and industrial activity occurring on these lands. As a result, physical and ecological changes have occurred that significantly affect plant and animal communities in many areas.

**Habitat Losses.** Fish and wildlife populations are dependent on the continuing presence and usability of crucial habitats, in adequate quantity and quality, for long-term maintenance. The most serious habitat losses caused by the oil and gas industry have been long-term or permanent



## Environmental Consequences

physical removal of habitat, long-term changes in habitat structure (i.e., vegetative composition) and creation of behavioral avoidance zones (areas of reduced habitat usability). For fish and other aquatic species, degradation of water quality through sedimentation, spills, thermal pollution, etc., would create a substantial loss in habitat.

If these losses occurred in crucial habitats or in habitats that provide buffer zones for crucial habitats, significant long-term reduction in the populations of affected species would occur. In the process, the condition of adjacent, undisturbed crucial habitat could deteriorate as a result of excessive use by displaced animals. This could cause reduced overall carrying capacity, further depressing wildlife populations.

Oil and gas industry activities such as geophysical exploration, exploratory drilling, road building and upgrading, field development (including all types of facility and equipment construction), pipeline construction, maintenance operations, and abandonment operations could cause habitat losses. If current or increased levels of industrial activity continued for another 10 to 60 years, in high-value habitat sites or important seasonal ranges, significant negative impacts to fish and wildlife populations would occur.

Based on a survey of disturbed acreage associated with producing wells in fields just within the Lander Resource Area, an average of 10 acres per producing well was physically disturbed. This acreage included well-site locations and facilities, local access roads and pipelines, field equipment buildings, and other facilities primarily associated with a producing field or group of wells. Using 10 acres per producing well, nearly 15,000 acres of disturbed surface (physical habitat loss) has occurred as a result of well development in the last 100 years. This figure does not include acreage disturbed by the drilling of and access to almost as many unsuccessful wells, acreage disturbed by geophysical exploration, acreage disturbed by major transport pipelines, or acreage disturbed or occupied by communities and local infrastructures established or expanded primarily as a result of oil and gas industry development. Examples include hundreds of miles of bladed seismicographic trails that have become permanent access roads throughout the resource area; the Amoco and Frontier pipelines and associated roads; the towns of Bairoil, Lamont, Lysite and Lost Cabin; the Forest Oil Camp; the Bison Basin Road; and the Sand Draw and Beaver Creek highways, all of which were established or expanded largely as a result of the oil and gas industry. At least

as much acreage has been disturbed or occupied as a result of all these associated activities as from the actual development of the producing wells. Thus, the overall estimate of physically disturbed acreage in the resource area totals about 30,000 acres through 1984. To determine the impact of oil and gas activities on wildlife habitat, one must consider the acreage that has been reclaimed to pre-disturbance vegetative density and composition. Some areas have been rehabilitated to provide as good or better habitat for wildlife than before disturbance occurred. In other areas, rehabilitation efforts have been unsuccessful or have established habitat types of little value for the primary species involved. Limited rainfall, severe winter conditions, and poor soils make reclamation difficult. The length of time required to re-establish native vegetation to pre-disturbance composition and density would be increased by these environmental conditions.

In addition to the physical habitat losses resulting from oil and gas activity, losses in terms of habitat usability or behavioral avoidance zones must also be considered. The extent and type of human activities are the most important factors in determining these zones. Species involved, type of habitat, topography, and time of year also greatly influence the extent of these zones. Within these areas, 50 to 100 percent of the habitat value is expected to be lost (Thomas 1983). Using information developed by Thomas, a conservative estimate is that twice as much additional habitat is lost through creation of behavioral avoidance zones as is lost physically. This would total 90,000 acres of lost habitat from physical disturbance and behavioral avoidance over the last 100 years.

Based on available information and assuming that as much as one-third of the lost habitat has been restored, approximately 60,000 acres of land no longer provides habitat capable of supporting fish and wildlife populations at pre-development levels. If discovery and development of producing fields are correlated to habitat loss, 80 percent of the habitat loss has occurred in the last 39 years and 92 percent in the last 59 years (oil and gas management situation analysis). The average annual growth rate in number of wells drilled for the last 34 years has been 1.5 percent per year. If this rate continued in the resource area, an additional 60,000 acres of habitat would be lost in the next 60 years. This means 1,000 acres per year or 10,000 acres over the next 10 years.

Because there is a significant amount of high-potential oil and gas deposits in the Lander Resource Area, important habitat losses may occur over the next few years. Historically, 65



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percent of the wells have been successful in high-potential oil and gas areas, 10 percent have been successful in moderate-potential areas, and 4 percent in low-potential areas. Data for disturbed acreage associated with successful wells indicate that 97 percent of the disturbed acreage in the resource area has been in high-potential oil and gas areas.

At one time, many of the current high-potential oil and gas areas were considered low or moderate potential until discoveries were made. Low or moderate potential does not preclude the possibility of extensive exploration and development in an area that would result in major habitat alterations and displacement of wildlife. Habitat losses are expected to impact populations of big game animals, sage grouse and raptors the most. In some management units, impacts on fish and other aquatic species could be significant under certain management alternatives. Also, under some management alternatives, serious effects on a wide variety of wildlife species would occur in some management units, where significant acreages of high-priority standard habitat sites are

lost. These are high value, limited occurrence habitat types described in the wildlife habitat section of the Affected Environment. Since precise predictions cannot be made about where future oil and gas activities will occur, precise predictions cannot be formulated as to the extent a particular big game herd, habitat site, sage grouse population, etc., will be affected by habitat losses. Nevertheless, some reasonable estimates can be arrived at using projected acreages of habitat losses in high and moderate potential oil and gas areas, and comparing this information with the location and acreages of important habitats for affected wildlife species (see Affected Environment-Wildlife, including maps 3-7 through 3-11, and tables 3-13 through 3-17, and oil and gas map 3-2, oil and gas potential). Within the resource area, approximately 18 percent of the total acreage is in the high-potential oil and gas category and 23 percent is in the moderate-potential category. The remaining 59 percent has low or no potential. Table 4-1 shows the percentage of total high and moderate potential acreage in the resource area occurring in each management unit and the approximate percentage of total wells drilled

**TABLE 4-1**  
**PERCENT OF TOTAL WELLS DRILLED AND**  
**PERCENT OF TOTAL ACREAGE OF HIGH**  
**AND MODERATE OIL AND GAS POTENTIAL**  
**IN THE LANDER RESOURCE AREA**  
**OCCURRING IN EACH MANAGEMENT UNIT**

Management Unit	Percent of Total Wells Drilled Thru 1984	Percent of Total High Potential Acreage in Management Unit	Percent of Total Moderate Potential Acreage in Management Unit	Percent of Total New Wells Projected to be Drilled Thru 2044
Gas Hills	29.1%	53%	41%	30% to 40%
Beaver Creek	54.1%	41%	41%	40% to 50%
Green Mountain	11.4%	5%	7%	10% to 15%
Lander Slope	1.5%	0%	0%	0%
Red Canyon	.5%	0%	0%	0%
South Pass	0%	0%	0%	0%
Dubois	3.0%	1%	1%	1% to 3%
East Fork	.3%	0%	3%	0%
Whiskey Mountain	0%	0%	0%	0%
Dubois Badlands	0%	0%	2%	0%
<b>Totals</b>		<b>100% = 452,480 acres</b>	<b>100% = 585,600 acres</b>	

## Environmental Consequences

through 1984 in each management unit. Information in this table provides an indication of where, by management unit, much of the industry activity has taken place in the past and where it is most likely to occur in the future. Table 4-2 shows the acreage of some of the most important wildlife habitats in each management unit overlapped by high potential or moderate potential in oil and gas areas. This provides an indication by management unit of the terrestrial wildlife species/habitat that will be significantly impacted, based on projections of current industry statistics.

A more specific projection of habitat losses and species affected is presented in the following analyses of environmental consequences by management alternative, resource and management action.

**Stress, Disturbance and Displacement.** In addition to the impacts from habitat loss, wildlife populations may be seriously affected by oil and gas industry activities which subject animals to excessive stress, disturbance or displacement. Such activities are not limited to the oil and gas industry. A wide variety of human activities involved in industrial, agricultural, and recreational pursuits, can create similar impacts on wild animals. The oil and gas industry is a major contributor to these types of impacts because their activities are wide-spread throughout the resource area and they primarily work in rural areas that are often prime wildlife habitats. Also, their operations are often intermittent, with changing phases, making it more difficult for wild animals to adapt to the intrusions. The operations usually involve large mobile, noisy equipment such as drilling rigs, earth moving equipment, trucks, ditches, helicopters, snow removal equipment, over-snow vehicles, and use of explosives. Commonly, numerous transport vehicles and workers are involved. The major industry operations causing these types of impacts are geophysical exploration, wildcat drilling, access road development into remote sites, and transport pipeline construction.

Impacts on wildlife become more serious when they occur during certain critical periods of the animal's normal life cycle. Species in the Lander Resource Area most subject to impacts during critical periods are the big game species, sage grouse and various raptors. The most critical periods for these species are winter and parturition seasons for big game and the breeding-nesting (including fledging for raptors) periods for sage grouse and raptors.

One major objective of modern wildlife management is to sustain animal populations over the winter season near planned objective levels and maintain conditions that will provide for high levels of reproduction and survival of healthy offspring. This objective and rationale is similar to a typical livestock operation, only much more difficult to accomplish with wild animals which to a large extent, must be left to cope with the rigors of their habitats. To accomplish these objectives, wildlife managers attempt to maintain habitats, reduce conflicts with other wild and domestic animals, reduce mortality of base populations, perpetuate good annual reproduction and survival of young, and to provide for and control the annual harvest of surplus animals. These efforts are made to ensure that there is a long-term sustained yield and some degree of stability in the production of esthetic, consumptive, scientific, and economic wildlife resource values.

Winter is the most critical period for big game animals in this region. Animals are commonly under extreme environmental stress, enduring cold temperatures, deep snow and forage limited in availability and nutritional quality, all of which contribute to a negative energy balance. Under these conditions, it is normal for mortality to occur. Mortality will fluctuate significantly from year to year, depending on the severity of the winter. A base population of females carrying young will survive, but often by late winter and early spring, the number surviving and their potential for successful parturition of healthy young animals is in a delicate balance. Based on long-term experience, and knowledge of this situation, many wildlife professionals have long opposed the imposition of additional, unnatural man-caused stress, such as that inherent in oil and gas industry activities, on wintering big game herds. Oil and gas activities can cause additional negative effects on environmentally stressed big game herds on winter ranges.

Research on the effects of oil and gas activity on big game or any other wildlife is very limited. As reported in a publication by Larry Seeman Associates, Inc., and the University of Wyoming Zoology Department in 1984, most studies that have been conducted lacked adequate controls and have been short-term baseline inventories. Studies documented big game populations displacement but precluded accurate interpretation of the effects on complex population dynamics. Hunted big game herds apparently respond more strongly to human disturbances than unhunted herds. All segments of all big game

**TABLE 4-2**  
**ACREAGE OF HIGH IMPORTANCE WILDLIFE HABITATS,**  
**BY MANAGEMENT UNIT, OVERLAPPING HIGH AND**  
**MODERATE POTENTIAL OIL AND GAS AREAS**

Management Units	High Potential Oil and Gas Areas								Moderate Potential Oil and Gas Areas								
	Crucial Elk Winter Range	Elk Winter Range	Elk Calving Areas	Crucial Mule Deer Winter Range	Mule Deer Winter/ YL Range	Crucial Antelope Winter/ YL Range	Crucial Winter /YL Moose Range	Sage Grouse Breeding Nesting Area	Crucial Elk Winter Range	Elk Winter Range	Elk Calving Areas	Elk Winter Relief Range	Crucial Mule Deer Winter Range	Crucial Antelope Winter/ YL Range	Crucial Bighorn Sheep Range	Crucial Winter /YL Moose Range	Sage Grouse Breeding Nesting Area
Gas Hills	—	—	—	38,720	106,560	91,400	—	(5 leks) 36,480	—	1,600	—	—	12,800	48,000	—	—	(10 leks) 48,000
Beaver Creek	—	—	—	4,824	12,880	18,600	2,520	(7 leks) 61,120	—	16,000	—	16,000	15,360	36,960	—	5,200	(6 leks) 55,360
Green Mountain	5,000	3,000	1,160	2,080	7,600	—	—	3,200	7,360	4,800	3,840	—	1,840	—	—	—	—
Lander Slope	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Red Canyon	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
South Pass	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dubois	—	1,120	—	—	1,280	—	1,120	—	9,280	7,680	—	—	17,280	3,920	3,440	9,600	—
East Fork	—	—	—	—	—	—	—	—	16,800	—	—	—	5,120	—	1,280	5,120	—
Whiskey Mountain	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dubois Badlands	—	—	—	—	—	—	—	—	3,840	—	—	—	12,160	8,320	12,160	—	—
Copper Mtn.	—	—	—	1,600	4,160	—	—	—	—	—	—	—	—	—	—	—	—
Totals	5,000	4,120	1,160	47,224	132,480	111,000	3,640	100,800	33,400	33,920	3,840	16,000	64,560	97,200	16,880	19,920	103,360

## Environmental Consequences

herds in the Lander Resource Area are subject to sport hunting, with the exception of ewe and lamb bighorn sheep. There is apparently no research available that adequately documents, quantitatively, the effects of disturbance, displacement and stress caused by oil and gas activities on big game population levels. Winter is the time when many natural factors that threaten the survival of individual animals occur. Some survive, some die and some pull through but are in such poor condition that they have underdeveloped young with low survival potential. Some abort or resorb fetuses. The more severe and stressful the winter, the greater the mortality and potential for reduced reproductive success. Fewer animals with less reproduction means a lower population. This occurs naturally without the imposition of additional abnormal stress and displacement caused by humans (oil and gas activities). Therefore, it is reasonable to assume that during these periods of extreme population limiting stress, any additional outside stress can compound those factors, contributing to mortality and reduced reproductive success and, have negative effects on big game population levels. We cannot, at this time, accurately quantify the effects that can be caused by the oil and gas industry. However, through the use of seasonal stipulations, most adverse impacts can be prevented or minimized.

The effects of oil and gas activities on elk calving and bighorn sheep lambing could be significant for some herds in the resource area. In most of the resource area, for most big game herds, parturition is dispersed enough that effects of oil and gas activities are not expected to be significant.

In those herd units where concentrated parturition areas are documented, the disturbance and displacement of female elk with young or bighorn ewes with lambs could significantly reduce survival of young. Female big game animals with young are more reactive than other groups. The potential for mortality to young animals is high because of the vulnerability to predation, accidents and disease (Schlegel 1978). The first few days after birth, the ability for young animals to travel is extremely restricted. There is also concern that females displaced out of preferred habitats just before parturition may have young in unfavorable areas, reducing the chances for the calf or lamb to survive.

Success of breeding activity on sage grouse leks and the success of nesting and brood hatching throughout associated nesting habitat can be negatively affected by a variety of oil and gas

operations during the breeding-nesting period. Disturbances that disrupt the courtship breeding rituals on sage grouse leks may disperse grouse out of historical areas, scatter mature hens and breeding males and cause small groups to attempt to establish grounds in less desirable areas unfamiliar to the local populations. This may result in fewer successful nesting attempts and short-term population reduction. Prolonged, repeated or exceptionally disturbing activities such as blasting in prime nesting areas can cause abandonment of significant numbers of nests and reductions in local populations. In some parts of the resource area, impacts from geophysical exploration could be extremely detrimental, because these areas attract seismograph projects year after year. Habitat losses from oil and gas development in nesting areas can cause more serious long-term effects on sage grouse populations than short-term disturbing activities. However, oil and gas operations causing habitat losses are not controlled (with the exception of the lek itself). Minimizing losses in annual reproduction through use of seasonal stipulations to reduce disturbance of breeding-nesting processes in intact habitats may help offset some habitat related losses.

Human disturbances to raptors is particularly detrimental during the breeding-nesting season (Olendorf et al. 1980). Each species breeds at a slightly different time. Species most likely to be affected by oil and gas activities in the Lander Resource Area are the golden eagle, prairie falcon, ferruginous hawk, Swainsons hawk, red-tailed hawk, goshawk, and burrowing owl. There is known nesting of these raptors in high-potential oil and gas areas and areas where recent geophysical activities have been heavy. Disturbance during nesting activity can lead to nest abandonment or reduced survival of young when parents spend too much time displaced from the nest. Losses from predation and injury also occur when young raptors approaching the fledging stage are disturbed, causing them to leave the nest before they can fly. Eggs are often flipped out of the nest when incubating birds leave the nest rapidly as a result of disturbance. This has been especially noted with prairie falcons. Where disturbing activities take place during the breeding-nesting season in areas of preferred raptor nesting habitat (such as along Beaver Rim) local populations may be depressed.

### Management Actions for Locatable Minerals

Locatable mineral prospecting, claim staking, assessment work, exploration, development, and

## Environmental Consequences

mining activities have occurred in the Lander Resource Area for over 100 years. Mining activities have been cyclic between periods of intense activity and recession from the time gold was discovered on South Pass in the 1860s, to the present downturn in the uranium industry at Gas Hills and Crooks Gap. The mining industry has had, and still has, tremendous impacts on social and economic conditions throughout the region during this time. Although not well documented, the mining industry has undoubtedly had significant effects on fish and wildlife populations. Mining industry activities have been less wide spread across the resource area but, in some cases, are more concentrated and surface dominating, locally, than oil and gas industry activities have been. Like the oil and gas industry, the mining industry has brought in large numbers of people and new technology, which has changed and expanded human and industrial activities taking place on rural lands. As a result of these activities, physical and ecological changes occur that significantly affect plant and animal communities.

The exploration and development activities of the mining industry employs many of the same methods and results in much the same effect on fish and wildlife resources as the oil and gas industry. Where some minimum level of mining industry activity takes place in high-value habitats, significant negative impacts on fish and wildlife occur because of habitat losses and the effect on animals from stress, disturbance and displacement.

Unlike the oil and gas industry, mining activities under the 1872 Mining Law are not subject to many of the restrictions that can be used to protect other resources such as fish and wildlife. Seasonal restrictions or no surface occupancy restrictions cannot be used to protect wintering big game concentrations on streams and riparian habitats. For example, placer mining and dredging, which causes destruction or long-term degradation of a trout stream and riparian habitat, can legally occur. Uranium exploration drilling program can take place through the winter months in a crucial elk or bighorn sheep winter range with no regulatory recourse. Open-pit uranium mines involving hundreds or even thousands of acres can be developed in concentrated big game winter ranges with little regulation other than required rehabilitation at some future date. If threatened or endangered species are involved, a greater degree of protection may be possible. The BLM's surface management regulation, 43 CFR 3809, cannot prevent habitat losses, either short term or long term. With a mining plan requirement,

however, impacts can be determined before they occur, which may facilitate some mitigation. Also, eventual rehabilitation of some kind can be assured.

Because the 1872 Mining Law provides for the long-term sacrifice of other multiple use resource values in the development of locatable minerals, the use of a mineral withdrawal is the only way, in some instances, to ensure that very high-value wildlife resources are protected.

Uranium industry activities have affected fish and wildlife habitats more than any other locatable mineral. Significant impacts have occurred in the Gas Hills, Beaver Creek, and Green Mountain Management units, and significant uranium reserves remain. Gold mining activities have affected wildlife resources in the Gas Hills, Beaver Creek and the South Pass Management units. Some gold mining activity is likely to continue, along with negative impacts on fish and wildlife, especially in the South Pass Unit. Some habitat has been damaged or lost as a result of activities involving known deposits of zeolite, iron, jade, and to a lesser extent, copper, silver, and tungsten. These minerals are known to occur in the management units mentioned above. It is assumed that all of these minerals, including uranium and gold, will be explored for, developed, or mined with some degree of probability in the future and fish and wildlife resources will be affected.

Knowledge of locatable minerals in the Red Canyon, Lander Slope, Dubois Area, Dubois Badlands, Whiskey Mountain, and East Fork Management units is very limited. There are some reported low-grade uranium deposits in the Dubois Area and some unconfirmed reports of gold. In the Whiskey Mountain, East Fork, Red Canyon, Lander Slope, and Dubois Badlands Management units there are exceptionally high wildlife resource values. This is especially true for the big game values, because these management units provide the limiting winter ranges for big game populations that inhabit large portions of the Shoshone National Forest, including the Washakie, Fitzpatrick, and Popo Agie Wilderness areas, as well as important parts of the resource area. Interest in these big game herds, based on the aesthetic and nonconsumptive uses as well as consumptive uses, is not only local and statewide, but extends to regional, national, and even international clientele.

We cannot accurately predict when, where, how much, or what kind of mineral exploitation will take place in any of the management units. Uranium, gold and possibly some of the other known minerals will be exploited to some degree



## Environmental Consequences

in the Gas Hills, Beaver Creek, Green Mountain, and South Pass Management units. Based on the information available, it is not possible to predict if there will be any locatable mineral exploitation at all in the other management units. If locatable mineral exploration or development occurs in the East Fork, Whiskey Mountain, Dubois Badlands, Lander Slope, or Red Canyon units, wildlife resources, especially big game populations, will probably suffer serious long-term depletions.

More specific analysis of the effects of locatable mineral exploitation on fish and wildlife by resource management alternative and management action follows in Alternative A.

### Management Actions for ORV Management

The obvious impact to fish and wildlife of creating new roads and trails is the direct loss of wildlife habitat. The subtle impact on wildlife is the increased human activity caused by easier access to an area. With many wildlife species, avoidance of humans results in some highly productive habitats not being used. This avoidance behavior has been documented in elk, raptors, bighorn sheep, bears, bobcats, and many other wildlife species.

ORV management is complicated by oil and gas exploration and development in the resource area. New pipelines and seismic lines that are being rehabilitated are often used by the public as a new road. Once the public begins to use these pipelines and seismic lines as roads, it doesn't take long to destroy any reseeded grasses and transform a reclaimed right-of-way into a two-track road.

### Management Actions for Landownership Adjustments

Landownership adjustments could adversely impact fish and wildlife habitat in the Dubois, Whiskey Mountain, East Fork, Dubois Badlands, Lander Slope, Beaver Creek, and Gas Hills Management units. No parcels were identified in the South Pass Management Unit and no significant impacts would result from the disposal of two identified tracts in the Green Mountain Management Unit. Therefore, these two tracts are not discussed further. Also, there is no discussion of impacts to wildlife habitat that could result from either Recreation and Public Purpose Act patents or utility systems since site specific land use analysis would be completed as these individual cases are processed. The isolated land parcels in the Dubois and Lander area are depicted on maps 4-1 through 4-5. Wildlife habitat might be impacted if disposal of the parcels causes a change in land use.

### Management Actions for Fire Management

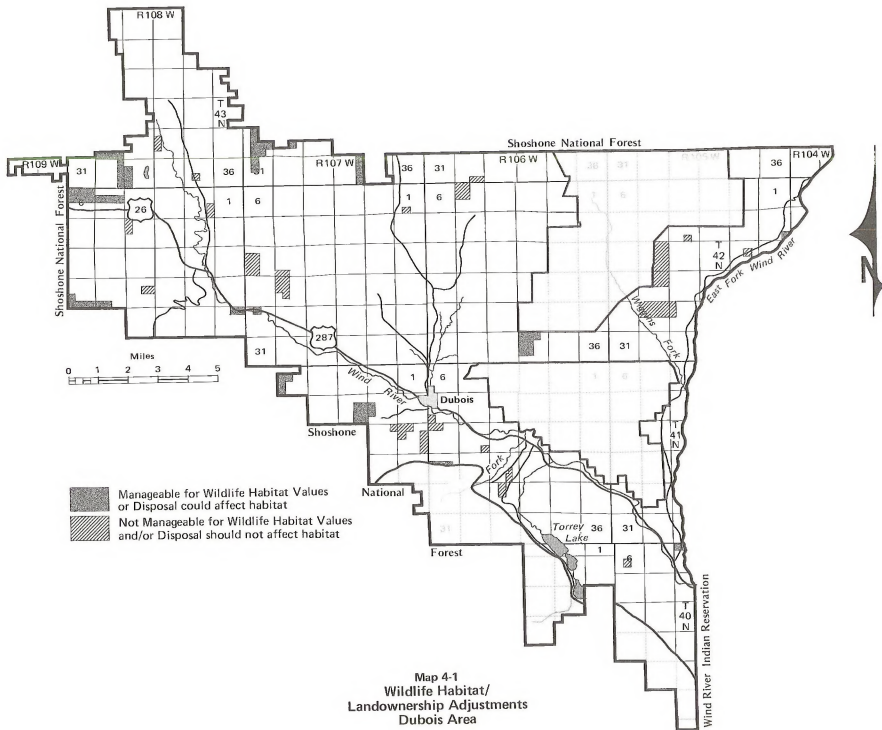
The potential to improve fish and wildlife habitat through the use of fire has not been fully explored in the Lander Resource Area. Full suppression of any wildfires has been the general policy of the past. Prescribed fire has been used very little and in most cases, the objective of the prescription was to increase livestock forage, which may or may not benefit wildlife.

Fire can have beneficial or negative impacts on wildlife habitat, depending on several specific factors. Decadent concentrations of shrubs such as serviceberry, chokecherry, mountain mahogany, and rabbitbrush can be burned under the right prescription and allowed to resprout producing higher nutrient values in the shrubs, improving palatability, and increasing plant vigor. Much of the decadent woody stems can be burned, with the potential of increasing new leaf biomass. Decadent stands of aspen and willow usually respond well to fire, producing new suckers the following year. However, heavy grazing often negates this suckering response. Through improvement of these beaver foods and structural materials, fisheries could be improved.

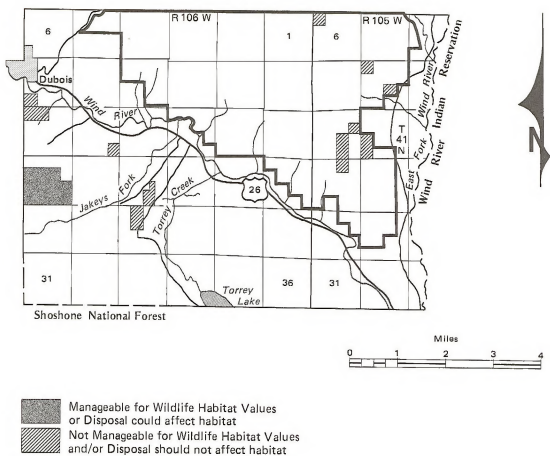
Whether prescribed fire will improve wildlife habitat depends on the objective of the burn and the prescription. Too hot a fire may kill plants and seeds, resulting in poor reproduction, poor sprouting and sterile soils. A fire that doesn't burn hot enough may not reduce dead wood and litter or only partially burn the targeted area. If the objective of a prescribed fire is to increase grasses and forbs and decrease sagebrush, the burn may be beneficial to wildlife if the area is a bighorn sheep winter range, but the same objective would be detrimental to wildlife if the area was an antelope winter range. How the area is currently being used by wildlife and what the postburn objective for vegetative composition is, determines whether the burn will have adverse or beneficial wildlife impacts.

Impacts to wildlife from wildfires also have positive and negative effects. As with prescribed fire, decadent shrub stands should be allowed to burn while highly productive habitats should be saved. Occasionally wildfires create a vegetative mosaic by burning in an irregular pattern at various heat intensities. This mosaic creates vegetative diversity, which results in an increase in wildlife species diversity.

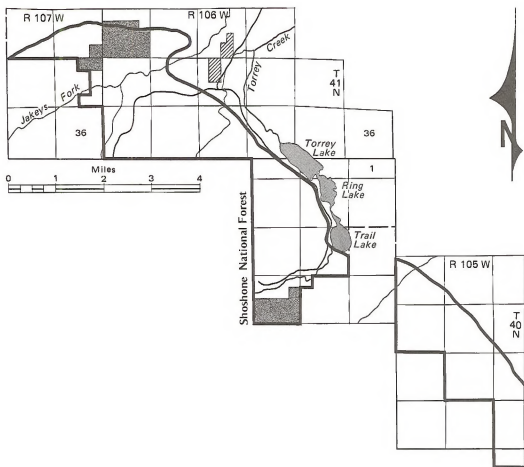
Each management unit has the same three alternatives for fire management: a) full suppression with no restrictions, b) full suppression with heavy equipment restrictions, and c) limited suppression with a specific plan for each management unit.





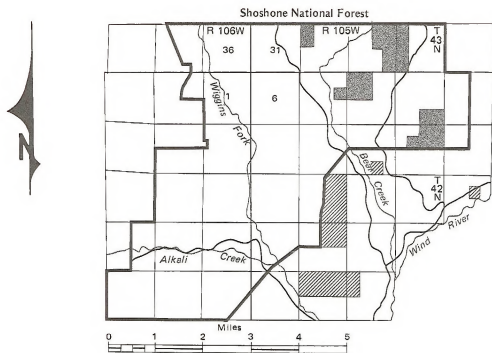




Map 4-2  
Wildlife Habitat/  
Landownership Adjustments  
Dubois Badlands



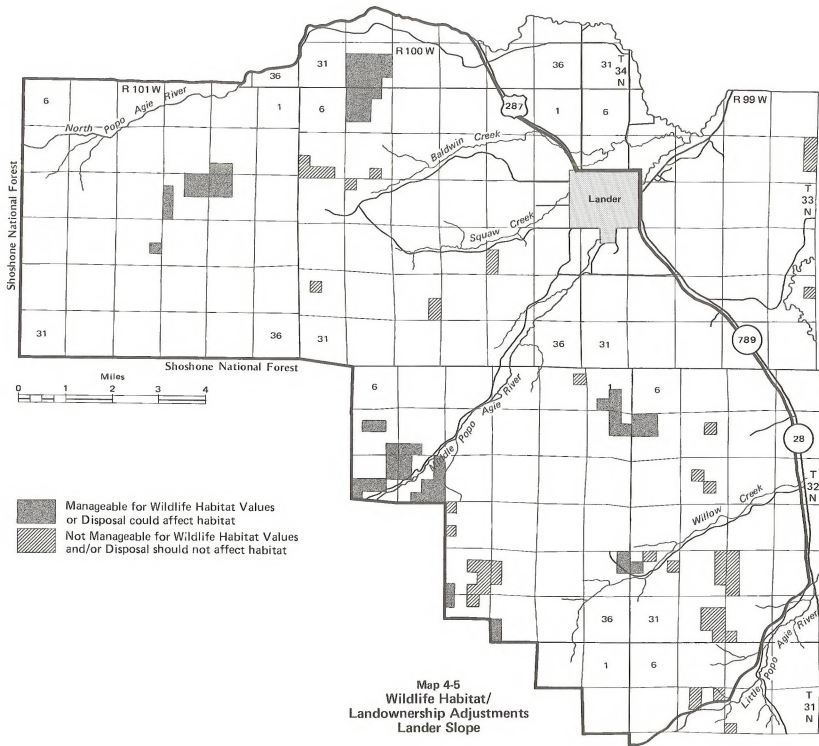
- Manageable for Wildlife Habitat Values  
or Disposal could affect habitat
- Not Manageable for Wildlife Habitat Values  
and/or Disposal should not affect habitat

Map 4-3  
Wildlife Habitat/  
Landownership Adjustments  
Whiskey Mountain



-  Manageable for Wildlife Habitat Values  
or Disposal could affect habitat
-  Not Manageable for Wildlife Habitat Values  
and/or Disposal should not affect habitat

Map 4-4  
Wildlife Habitat/  
Landownership Adjustments  
East Fork



## Environmental Consequences

Full suppression does not allow a wildfire to continue to burn, even when wildlife habitat is being improved.

In the past, extensive resource damage has occurred from attempts to fully suppress wildfire. Bulldozers and other heavy equipment have greatly disturbed soils causing erosion, increasing siltation in streams and reducing reclamation potential. When public safety and protection of private property are not an issue, many wildfires should be allowed to burn.

### Cultural/Natural History Resources

The environmental consequences of the various alternatives on cultural and natural history resources are numerous and highly varied. Many of the management actions of the alternatives will cause significant impacts (either beneficial or adverse) on important cultural resources if such actions are carried out. These actions are included in some or all of the alternatives of the oil and gas, locatable minerals, phosphates, landowner-ship adjustments and utility systems, and cultural/natural history sections. The remaining management actions, listed for common-variety mineral materials, coal, livestock grazing, fish and wildlife, forest management, recreation, fire management, and access are not expected to cause significant impacts on cultural or natural history resources.

The above conclusions are based on the assumption that standard BLM protection measures, detailed in the Management Actions Common to All Alternatives section, will continue to be used and will not be altered in the future. These measures will ensure that many cultural (but not natural history) resources are protected from adverse impacts.

### Recreation

Impacts on recreation tend to generally be the same for all alternatives for the oil and gas, locatable minerals, forestry, and livestock grazing management actions. Impacts from oil and gas activities can be beneficial or detrimental, depending on the recreational activity, and can affect the whole spectrum of recreation. The various recreational activities can be grouped into two broad categories: access oriented and solitude oriented. Access-oriented activities consist of four-wheeling, dirt biking, snowmobiling, etc. Solitude-oriented activities consist

of hiking, bird watching, cross-country skiing, etc. Other activities, such as hunting and fishing can fall into either category, depending on the user and his or her recreational objective.

### Management Actions for Oil and Gas

**Geophysical Exploration.** The effects of exploration on all types of recreation would be minimal. Noise disturbance would affect all recreationists to some degree, but as seismograph crews move rapidly, disturbance in any one area would only occur for a day or two.

Increased access, which could result from seismic exploration, opens up previously inaccessible areas to those recreationists who are access oriented. Increased access could be particularly beneficial to hunters. However, in areas where adequate access already exists, increased access might be detrimental to the quality of the hunt. For solitude-oriented recreationists, increased access, traffic and associated noise would detract from the quality of their experience.

**Exploration and Development.** Drilling for oil and gas affects all types of recreation. Prolonged periods of noise, long-term visual intrusions, and odors reduce the quality of the recreational experience. Within oil fields, hazards such as noxious fumes, heavy equipment, and potentially hazardous chemicals would be present. At the extreme, these factors could eliminate a site as a possible recreational area.

Access roads constructed for drill sites affect recreationists the same way as seismographic trails. However, even access-oriented recreationists might be affected. The access-oriented hunter who uses a well-site road might not find animals to hunt because of displacement by oil field activity.

As more jobs are created by oil and gas activity, the number of people using an area for recreation increases. This increased use can detract from the quality of a recreational experience for many activities.

**Production.** Impacts to the recreationist during the production phase of oil and gas activities would be caused by pipeline construction and installation of production facilities such as storage tanks. Construction of pipelines and facilities would provide increased vehicular access, noise pollution and visual intrusions. During construction, pipelines might create a temporary barrier

## Environmental Consequences

to off-road travel, which could pose a temporary hazard to recreationists.

**Abandonment.** After impacts caused by oil and gas activities from the exploration phase through the production phase have occurred, abandonment would improve the recreational experience. Access-oriented recreationists would be able to use the roads already constructed. Solitude-oriented recreationists would be able to enjoy areas that were once filled with oil field equipment but have returned to a more natural environment.

**Rehabilitation.** Reclamation of abandoned drill pads and access roads could only enhance the experience for the solitude-oriented recreationist. Loss of roads, because of rehabilitation, might disturb the access-oriented recreationist. However, if the road were used frequently, it might not respond to rehabilitation efforts and would constitute a residual impact.

Mining other minerals, like locatables, would usually be adverse to recreational use. The sights and sounds of mining lowers the quality of the recreational experience in areas adjacent to the mines. If mining were to significantly impact crucial wildlife habitat and thereby cause a reduction in wildlife populations, hunter successes would decline. If mining were to adversely impact important cultural, natural or historical sites, the public would lose the recreational opportunity to view and experience these important resources.

Forestry activities have a tendency to shift the recreational opportunities in an area from primitive or semi-primitive types to those that occur in roaded natural settings. The greater the amount of forestry activity in an area, the greater the amount of displacement. Hunting pressure generally increases with increased road access, as does driving for pleasure, ORV use, wood gathering, and similar activities. Motorized trail riding and most nonmotorized activities would be reduced or completely displaced.

Recreational opportunities would remain secure on land placed in the retention category. Recreational opportunities generally would be eliminated on lands that were disposed of, unless the disposition were to another federal agency, a state agency or a city or county government.

Management actions for livestock grazing would have a minimal overall impact on recreation. Use patterns and opportunities would remain unchanged from present ones. Volume of use would be relatively unaffected, unless range improvements resulted in increased wildlife populations. Increased wildlife populations would translate into increased hunting opportunities and increased opportunities to view wildlife.

Increases in the number of fences under the proposed action could decrease one's mobility and freedom of movement for recreational activities in the area. With more fencing, some people would perceive the area as less wild and natural with less open space. This alternative would have little or no impact on activities such as rock collecting, camping and picnicking. For more detailed information on the location of these types of impacts and their causes (see table 4-3).

### Livestock Grazing

None of the RMP alternatives would cause significant impacts to livestock grazing.

A comparison of the impacts, resulting from the proposed grazing management actions on the Green Mountain and Gas Hills study areas, essentially shows that expected impacts on the eight affected resources are very similar, and there is no reason to believe there would be any synergistic effects when the impacts are combined. The only cumulative effects would relate to the number of acres, miles of stream, wildlife numbers, etc., that would be affected. Refer to table 3-5 for a comparison of the cumulative impacts on the Green Mountain and Gas Hills study areas. Also, see the Livestock Grazing Supplement (including the Green Mountain Rangeland Program Summary) for specific impacts.

### Socioeconomics

None of the alternatives would cause significant socioeconomic impacts (see Appendix 3 for further information).

## ALTERNATIVE A - PRESENT MANAGEMENT - NO ACTION

### Management Actions for Energy and Minerals

Present management of the mineral resources within all management units would continue under Alternative A. Continuation of segregation and

TABLE 4-3  
IMPACTS ON RECREATION

				ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	PREFERRED ALTERNATIVE
Recreation Management Area	Management Unit	Resource Activity Grouping Impacts	Significant Available Resource	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis
Green Mountains	Green Mountains	Oil and Gas and Locatable Minerals Exploration and Development	Camping	No surface occupancy and no mining restrictions would preserve detention improvements and immediate action. Open exploration and development on remainder of 100 could decrease opportunities and values for primitive camping activities, especially in high oil and gas potential lands and high stream potential lands.	Same as Alternative A.	Lack of restrictions on oil and gas and mining could cause damage to detention improvements and immediate action. Open exploration and development on remainder of 100 could decrease opportunities and values for primitive camping activities, especially in high oil and gas potential lands and high stream potential lands.	Same as Alternative A.
				Hunting	No surface occupancy restrictions on crucial elk winter ranges and sage grouse leas would preserve hunting opportunities. Seasonal restrictions on crucial and critical mile deer, antelope and sage grouse winter ranges, elk calving and winter ranges, sage grouse nesting areas would help preserve hunting opportunities. Oil and gas exploration and development causing reduced cover and forage on seasonal restriction areas could reduce hunting opportunities due to animal displacement.	Same as Alternative A.	Lack of restrictions on crucial elk winter ranges and sage grouse leas could decrease hunting opportunities. Lack of restrictions on crucial and critical mile deer, antelope and sage grouse winter ranges, elk calving and winter ranges, and sage grouse nesting areas could decrease hunting opportunities. Oil and gas exploration and development causing reduced cover and forage could reduce hunting opportunities due to animal displacement.
				Locatable mineral exploration and development causing reduced cover and forage could reduce hunting opportunities due to animal displacement.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
			Oil and Gas and Locatable Minerals Exploration and Development	Providing, sight-seeing and hiking	No surface occupancy and mineral withdrawal would preserve the wild horse range and Prater. Thirty prairie area improvements and immediate action. Open exploration and development on remainder of 100 could decrease opportunities and values for primitive providing, sight-seeing and hiking. No surface occupancy restrictions would help preserve opportunities for mountaineering wildlife.	Same as Alternative A.	No restrictions could damage the wild horse range and Prater. Thirty prairie area improvements and immediate action. Open exploration and development on remainder of 100 could decrease opportunities and values for primitive providing, sight-seeing and hiking. Lack of restrictions could decrease opportunities for mountaineering wildlife.
	Fishing	No surface occupancy restrictions would preserve fishing opportunities in riparian areas and streams.			Same as Alternative A.	Minimal restrictions could decrease fishing opportunities in riparian areas and streams.	Same as Alternative A.
		Open locatable minerals exploration and development could decrease fishing opportunities due to riparian and stream disturbance.			Same as Alternative A.	Open locatable minerals exploration and development could decrease fishing opportunities due to riparian and stream disturbance.	Same as Alternative A.
	Snowmobiling and cross-country skiing	Open exploration and development could increase opportunities for snowmobile access, but could decrease wildlife values because of modern disturbances. Seasonal and no surface occupancy restrictions would preserve opportunities for mountaineering wildlife to winter.		Same as Alternative A.	Open locatable minerals exploration and development could decrease fishing opportunities due to riparian and stream disturbance.	Same as Alternative A.	



TABLE 4-3 (Continued)

				ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	REFERRED ALTERNATIVE
Recreation Management Area	Management Unit	Resource Activity/Gaining Impact	Significant Available Resource	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis
Green Mountain	Green Mountain	Fish and Wildlife	Camping, picnicking, sight-seeing, hiking, mountaineering, and cross-country skiing	Interpret improvement projects would increase opportunities for mountaineering wildlife.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
			Hunting and Fishing	Interpret improvement projects would increase hunting and fishing opportunities and values.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
	Forest Management	Hunting and Fishing	Camping, picnicking, sight-seeing, hiking, and cross-country skiing	Clearcutting and slash manipulation could decrease scenery values outside existing campgrounds and picnic areas through new clearcuts and surface disturbances.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
			Hunting and Fishing	Heavy logging and fuelwood cutting activities could decrease opportunities for encounter viewing animal life due to disturbances and animal displacement. Harvest restrictions could help maintain big game and fish habitat.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
	Recreation	Hunting and Fishing	Camping, picnicking, hunting, sight-seeing, hiking, and fishing	Maintaining the campground and picnic areas would preserve opportunities for camping and picnicking and would also support fishing, hiking, sight-seeing and hunting activities through the use of campgrounds and picnic areas for "base camps."	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
			Off-Road Vehicles	Hunting, fishing and sight-seeing	Off-road restrictions would accommodate opportunities for vehicular access to hunting, fishing and scenic areas. However, off-road restrictions could help prevent aerial displacement, which would maintain hunting opportunities.	Same as Alternative A.	Same as Alternative A.
	Fire Management	Hunting and Fishing	Camping, picnicking, sight-seeing, and hiking	Prescribed burns in the vicinity of the campgrounds and picnic areas could decrease the scenic opportunities for scenery and solitude. Unplanned disturbances caused by fighting fires could decrease opportunities for primitive camping and hiking through loss of forest cover, but could preserve other losses of opportunities for primitive camping, picnicking and hiking through the maintenance of forest cover.	Same as Alternative A.	Prescribed burns in the vicinity of the campgrounds and picnic areas could decrease the scenic opportunities for scenery and solitude. Unplanned disturbances could decrease opportunities for primitive camping and hiking through loss of forest cover.	Same as Alternative A.
			Access	Camping, hunting, picnicking, sight-seeing, hiking, fishing, mountaineering, and cross-country skiing	Maintaining access into the BPA would preserve present opportunities for access to camping, fishing, picnicking, sight-seeing, hiking, mountaineering, and cross-country scenic values.	Same as Alternative A.	Same as Alternative A.

TABLE 4-3 (Continued)

Recreation Management Area	Management Unit	Resource Activity Causing Impacts	Significant Available Resource	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	REFERRED ALTERNATIVE
				Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis
Oregon/Idahoan Trail	Boone Creek and Gas Hills	Oil and Gas	Trail re-enclosures, trails, hiking, sight-seeing, and picnicking	No surface occupancy restrictions along the trail corridor and withdrawals at some trail-related sites would preserve opportunities for trail re-enclosures and historical appreciation of the trail's settings, and would preserve existing improvements at the Split Rock and Devil's Gate Interpretive sites.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
		Locatable Minerals	Trail re-enclosures, trails, hiking, sight-seeing, and picnicking	Closed mining restrictions would preserve opportunities at Split Rock and Devil's Gate Interpretive sites and would preserve opportunities for historical appreciation of the trail's settings at the Split Rock, Devil's Gate and Rocky Ridge historical sites. Open exploration and development on the remainder of the trail could decrease trail re-enclosures, hiking, biking, and sight-seeing opportunities along the trail.	Closed mining restrictions would preserve improvements at Split Rock Interpretive Site and would preserve opportunities for historical appreciation of the trail's settings at the Devil's Gate, Split Rock, Gillespie Place, Willes Summit, and Rocky Ridge historical sites. Plans of operations restrictions along the trail corridor would preserve opportunities for trail re-enclosures and historical appreciation over the whole trail to the unit.	Same as Alternative A.	Same as Alternative A.
	Fish and Wildlife	Trail re-enclosures, trails, hiking, sight-seeing, and picnicking	Trail re-enclosures, trails, hiking, sight-seeing, and picnicking	Wildlife management projects would increase opportunities for monitoring wildlife.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
		Landownership Adjustments and Utility Systems	Trail re-enclosures, trails, hiking, sight-seeing, and picnicking	Utility systems placed on private trail segments could reduce opportunities for historical appreciation of the trail's settings through modern intrusions on the historical resources.	Utility systems and landownership disposition restricted near private trail segments would preserve opportunities for historical appreciation of the trail's settings through modern intrusions on the historical resources.	Same as Alternative A.	Same as Alternative A.
	Recreation	Trail re-enclosures, trails, hiking, sight-seeing, and picnicking	Trail re-enclosures, trails, hiking, sight-seeing, and picnicking	Maintaining the interpretive sites at Split Rock and Devil's Gate would preserve opportunities for sight-seeing and picnicking. Active management of the Oregon/Idahoan Trail would preserve opportunities for trail re-enclosures, trails, hiking, sight-seeing, and historical appreciation.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
	Off-road Vehicles	Trail re-enclosures, trails, hiking, sight-seeing, and picnicking	Trail re-enclosures, trails, hiking, sight-seeing, and picnicking	Off restrictions would preserve opportunities for historical appreciation of the trail's setting through the provision of vehicular disturbances.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

TABLE 4-3 (Continued)

				ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	PREFERRED ALTERNATIVE
Recreation Management Area	Management Unit	Resource Activity Causing Impacts	Significant Available Resource	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis
Oregon/Heumen Trail	Shower Creek and One Mile	Cultural/Historical History	Trail re-enactments, trails, hiking, sight-seeing, and picnicking	Management according to the Oregon/Heumen Trail Management Plan would preserve opportunities for trail re-enactments, trails, hiking, sight-seeing, picnicking and historical appreciation.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
		Pine Management	Trail re-enactments, trails, hiking, sight-seeing, and picnicking	Buildover disturbances caused by firefighting activities could decrease opportunities for historical appreciation of the trail's setting, and could adversely affect the quality of trail re-enactments, trails, sight-seeing, and picnicking through the introduction of modern disturbances.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
		Access	Trail re-enactments, trails, hiking, sight-seeing, and picnicking	Relocating present access into the RMA would preserve the present opportunities for historical appreciation and the present qualities of trail re-enactments, trails, hiking, sight-seeing, and picnicking.	Increased access possibilities into the RMA would increase the access opportunities for historical appreciation and of trail re-enactments, trails, hiking, sight-seeing, and picnicking, but could decrease the quality of those experiences due to new situations.	Same as Alternative A.	Same as Alternative B.
Lander Slope/Red Canyon	Lander Slope and One Canyon	Old and One	Hunting and sight-seeing	Closure of leasing, exploitation and development would preserve opportunities for encountering wildlife and for sight-seeing of the scenic natural values of the RMA.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.
		Recreation	Hunting and sight-seeing	Same as old and one.	Closure of leasing exploitation and development would preserve opportunities for encountering wildlife and for sight-seeing of scenic natural values of the RMA.	Same as Alternative A.	Same as Alternative B.
			Snowmobiling and cross-country skiing	Same as old and one.	Closure of leasing exploitation and development would preserve opportunities for solitude in the RMA for skiers.	Same as Alternative A.	Same as Alternative A.
		Fish and Wildlife	Hunting and sight-seeing	Habitat improvements would increase opportunities for encountering wildlife in the RMA.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
			Snowmobiling and cross-country skiing	Habitat improvements would increase opportunities for encountering wildlife in the RMA to winter.	Same as Alternative A.	Harvesting in Red Canyon and Lander Slope could decrease opportunities for sight-seeing of scenic and natural values through disturbances in forest cover, access roads and other intrusions.	Same as Alternative B.
	Forestry	Sight-seeing	Lack of timber management would maintain opportunities for sight-seeing of scenic and natural values in the Lander Slope portion of the RMA. Harvesting in Red Canyon would decrease opportunities for sight-seeing of scenic and natural values through forest cover disturbances, access roads and other intrusions.	Harvesting opportunities in the Lander Slope and Red Canyon area could decrease sight-seeing of scenic and natural values through changes in forest cover, access roads and other intrusions. However, harvest restrictions could maintain opportunities for encountering wildlife, especially elk.	Harvesting in the Lander Slope and Red Canyon area could increase opportunities for encountering through new access roads, but could decrease solitude values for skiers at the same time due to surface disturbances.	Same as Alternative B.	

TABLE 4-3 (Continued)

Recreation Management Area	Management Unit	Resource Activity Overlay Impacts	ALTERNATIVE A		ALTERNATIVE B		ALTERNATIVE C		Preferred Alternative
			Significant Available Resource	Management Action and Impact Analysis	Significant Available Resource	Management Action and Impact Analysis	Significant Available Resource	Management Action and Impact Analysis	
Lander Slope/	Lander Slope	Forestry	Snowmobiling and cross-country skiing	Recreation in the Red Canyon area could increase opportunities for snowmobiling through new access roads but could decrease solitude values for skiers at the same time due to modern disturbances.	Harvesting in the Lander Slope area could increase opportunities for snowmobiling through new access roads but could decrease solitude values for skiers at the same time due to surface disturbances.	Open utility system development in Lander Slope and Red Canyon could decrease opportunities for sight-seeing of natural and scenic values through new surface disturbances and intrusions.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.
				Closure of utility systems along the Lander Slope would preserve scenic and natural values for sight-seeing. Open utility system development in Red Canyon could decrease opportunities for sight-seeing of natural and scenic values through new surface disturbances and intrusions.	Closure of utility systems in Red Canyon and along east of the Lander Slope would preserve scenic and natural values for sight-seeing. Open utility system development along the footlands of the Lander Slope could decrease sight-seeing opportunities through surface disturbances and intrusions.				
				Open utility system development could decrease opportunities for solitude for skiers in Red Canyon.	Closure of utility systems in most of the Lander Slope and Red Canyon would preserve solitude values for skiers.				
Recreation	Lander Slope	Forestry	Snowmobiling and cross-country skiing	No special management actions would be taken. Red Canyon HCR would not be interpreted and visitor information and appreciation for the natural and scenic values would not be provided.	Added interpretation for Red Canyon HCR would increase opportunities for sight-seeing natural and scenic values through increased appreciation.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.
				Cross-country skiing and snowmobiling would continue.	Closure of elk winter range to winter sports would prevent opportunities for snowmobile and cross-country skiing.				
Off-road Vehicles	Lander Slope	Forestry	Snowmobiling and cross-country skiing	Only restrictions would accommodate access for sight-seeing opportunities in some areas through permanent and seasonal road closures. If the same time road closures could preserve opportunities for sight-seeing of natural and scenic values through reduction or prevention of vehicular surface disturbances.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
				Opening of an area to snowmobiling, excluding the Red Canyon elk winter range, would preserve opportunities for snowmobiling recreation. The over-snow vehicle closures in Red Canyon would have minimal impact on snowmobile users.	Same as Alternative A.				
Cultural/Natural History	Lander Slope	Forestry	Snowmobiling and cross-country skiing	Management of part of Red Canyon as a National Natural Landmark would maintain opportunities for sight-seeing of scenic and natural values.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
				Management of part of Red Canyon as a National Natural Landmark would preserve opportunities for solitude for skiers.	Same as Alternative A.				

TABLE 4-3 (Continued)

Recreation Management Area	Management Unit	Resource Activity Causing Impacts	ALTERNATIVE A		ALTERNATIVE B		ALTERNATIVE C		PROPOSED ALTERNATIVE	
			Significant Available Resource	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis
Lander Slope/ Ice Canyon	Lander Slope and Ice Canyon	Fire Management	Sight-seeing	Intensive firefighting, including helicopter use, could decrease opportunities for sight-seeing of scenic and natural values through new surface disturbances.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
			Snowmobiling and cross-country skiing	Intensive firefighting, including bulldozer use, could increase access opportunities for snowmobiling recreation.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
		Access	Sight-seeing	Maintenance of present access would preserve present opportunities for access to scenic and natural areas.	Maintenance of present access in Ice Canyon would preserve present opportunities for access to scenic and natural areas. Increased access possibilities in Lander Slope could increase sight-seeing opportunities.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
			Snowmobiling and cross-country skiing	Maintenance of present access would preserve present opportunities for access to snowmobiling areas and skiing areas.	Maintenance of present access in Ice Canyon would preserve present opportunities for access to snowmobiling areas and skiing areas. Increased access possibilities in Lander Slope could increase snowmobiling access.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
	Oil and Gas	Hunting and sight-seeing	Sight-seeing	Closure of leasing, exploration and development would preserve opportunities for encountering wildlife and sight-seeing of the scenic natural values of the BPA.	No surface occupancy over much of the BPA would preserve opportunities for encountering wildlife and for sight-seeing of the scenic natural values of the BPA.	Open leasing, exploration and development could decrease opportunities for encountering wildlife and for sight-seeing of the scenic natural values of the BPA.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
			Snowmobiling and cross-country skiing	Closure of leasing, exploration and development would preserve opportunities for solitude in the BPA for skiers.	No surface occupancy over much of the BPA would preserve opportunities for solitude in the BPA for skiers.	Open leasing exploration and development could decrease opportunities for solitude in the BPA for skiers.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
	Locatable Minerals	Sight-seeing	Sight-seeing	Open exploration and development could decrease opportunities for sight-seeing of scenic and natural values of the BPA through surface disturbances and modern infrastructure.	Status of operation on exploration and development would help preserve opportunities for sight-seeing of scenic and natural values of the BPA through the protective management of surface disturbances and modern infrastructure.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
			Snowmobiling and cross-country skiing	Open exploration and development could increase scenic and solitude values of the BPA for skiers through introduction of modern infrastructure.	Status of operation restrictions, exploration and development would help preserve scenic and solitude values of the BPA for skiers.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

TABLE 4-3 (Continued)

				ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	PREFERRED ALTERNATIVE	
Recreation Management Area	Management Goal	Resource Activity/Gaining Impacts	Significant Available Resource	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	
South Bass Historic Mining District	South Bass	Oil and Gas Exploration and Development	Hunting	Open exploration and development on part of the IMA could decrease opportunities for hunting through loss of habitat and animal disturbance while increasing hunting access opportunities through increased road construction. At the same time, no surface occupancy restrictions would preserve hunting opportunities for sage grouse through preservation of breeding grounds. Seasonal restrictions would help preserve hunting opportunities for elk, mule deer and sage grouse through prevention of disturbances at critical times for each species.	Open exploration and development on a small part of the IMA could decrease opportunities for hunting through loss of habitat and animal disturbance while increasing hunting access opportunities through increased road construction. At the same time, no surface occupancy restrictions would preserve hunting opportunities for sage grouse through preservation of habitat and breeding grounds. Seasonal restrictions would help preserve hunting opportunities for elk, mule deer and sage grouse through prevention of disturbances at critical times for each species.	Open exploration and development in the IMA could decrease opportunities for hunting through loss of habitat and animal disturbance while increasing hunting access opportunities through increased road construction of habitat. At the same time, no surface occupancy restrictions would preserve hunting opportunities for sage grouse through preservation of breeding grounds. Seasonal restrictions would help preserve hunting opportunities for elk, mule deer and sage grouse through prevention of disturbances at critical times for each species.	Same as Alternative B.	
			Camping	Open exploration and development on parts of the IMA could decrease opportunities for primitive camping. At the same time, no surface occupancy restrictions would preserve the two South Bass Campground improvements and their immediate surroundings.	No surface occupancy on much of the IMA could preserve opportunities for primitive camping. Also, no surface occupancy restrictions would preserve the two South Bass Campground improvements and their immediate surroundings.	Same as Alternative A.	Same as Alternative B.	
			Oil and Gas Exploration and Development	Single-section, drilling and prodding	Open exploration and development on parts of the IMA could decrease opportunities for hiking, prodding and sight-seeing of natural values through the introduction of modern surface disturbances and vibrations. At the same time, no surface occupancy and seasonal restrictions would increase the opportunities for encountering wildlife.	Open exploration and development on small parts of the IMA could decrease opportunities for hiking, prodding and sight-seeing of natural values through the introduction of modern surface disturbances and vibrations. At the same time, no surface occupancy and seasonal restrictions would preserve hiking, prodding and sight-seeing. Also opportunities in natural and scenic areas would increase the opportunities for encountering wildlife.	Same as Alternative A.	Same as Alternative B.
			Fishing	No surface occupancy restrictions would preserve fishing opportunities in riparian areas and streams through maintenance of fisheries habitat.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	
			Shovelblowing and cross-country skiing	Open exploration and development could decrease opportunities for shovelblowing across, but could increase suitable values. Seasonal and no surface occupancy restrictions would preserve opportunities for encountering wildlife in winter.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	

TABLE 4-3 (Continued)

Management Action	Management Unit	Resource Activity Grouping Impacts	Significant Area/Labile Resource	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	UNDEVELOPED ALTERNATIVE
				Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis
South Ross Historic Mining District	South Ross	Locatable Minerals Exploration and Development	Hunting	Mining restrictions on segregated lands, because of wildlife concerns, could preserve hunting opportunities. Locatable mineral exploration and development on open lands causing reduced cover and forage could reduce hunting opportunities due to animal displacement.	Mining restrictions, segregation and plans of operation could preserve hunting opportunities.	Locatable mineral exploration and development on open lands causing reduction of cover and forage could reduce hunting opportunities due to animal displacement.	Same as Alternative B.
				Camping	Closed mining restrictions would preserve the two South Ross Campground improvements and immediate settings. Open exploration and development on remainder of IMA could decrease opportunities and values for primitive camping activities through the introduction of modern disturbances and intrusions.	Closed mining restrictions would preserve the two South Ross Campground improvements and immediate settings. Closure of mining on the remainder of the IMA would preserve opportunities and values for primitive camping activities through the introduction of modern disturbances and intrusions.	Same as Alternative A.
				Right-of-way, hiking and picnicking	Open exploration and development on remainder of IMA could decrease opportunities and values for primitive picnicking, right-of-way and hiking through modern disturbances. Segregated land restrictions would preserve opportunities for encountering wildlife.	Closed exploration and development on remainder of IMA could preserve opportunities and values for primitive picnicking, right-of-way and hiking through modern disturbances. Closed mining restrictions would also help preserve opportunities for encountering wildlife.	Same as Alternative A.
	Locatable Minerals Exploration and Development	Fishing	Fishing	Segregated land restrictions would preserve fishing opportunities in riparian areas and streams. Open locatable mineral exploration and development could decrease fishing opportunities due to riparian and stream disturbances.	Closed mining restrictions would preserve fishing opportunities in certain riparian areas and streams.	Open locatable mineral exploration and development could decrease fishing opportunities due to riparian and stream disturbances.	Same as Alternative A.
				Recreational and cross-country skiing	Open exploration and development could increase opportunities for accessible access through new access roads, but could decrease animals values. Segregated land restrictions would help preserve opportunities for encountering wildlife in winter.	Closure of mining would preserve present opportunities for accessible access and would preserve animals values. Closed mining restrictions would also help preserve opportunities for encountering wildlife in winter.	Same as Alternative A.



TABLE 4-3 (Continued)

Recreation Management Area	Management Unit	Resource Activity Grouping Impacts	Significant Available Resource	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	PROPPOSED ALTERNATIVE
				Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis
South Platte Historic Mining District	South Platte	Fish and Wildlife	Camping, picnicking, sight-seeing, hiking, snow-mobiling, and cross-country skiing	Habitat improvement projects would increase opportunities for encountering wildlife.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
				Habitat improvement projects would increase hunting and fishing opportunities and values.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
	Forest Management	Camping, picnicking, sight-seeing, and hiking	Hunting	Clearcutting and slash manipulations could decrease opportunities for camping, picnicking, hiking and sight-seeing of natural values outside existing compounds and picnic areas due to new intrusions.	Intensive clearcutting and slash manipulations could decrease opportunities for camping, picnicking, hiking, and sight-seeing of natural values outside existing compounds and picnic areas due to new intrusions.	Same as Alternative A.	Same as Alternative B.
				Heavy fuelwood cutting activities could decrease opportunities for encountering animal life due to loss of cover, disturbance and animal displacement. Harvest restrictions would help maintain fish habitat.	Heavy fuelwood cutting activities could decrease opportunities for encountering animal life due to loss of cover, disturbance, and animal displacement. Harvest restrictions could help maintain adequate wildlife habitat.	Same as Alternative A.	Same as Alternative A.
	Understandings Adjustments and Utility Systems	Picnicking, sight-seeing and hiking	Understandings Adjustments and Utility Systems	Utility systems placed in the South Platte area could reduce opportunities for historical appreciation of the mining district's settings through modern disturbances.	Utility system restrictions in the South Platte area would preserve opportunities for historical appreciation of the mining district's setting through the preservation of modern disturbances.	Same as Alternative A.	Same as Alternative A.
	Recreation	Camping, picnicking, hunting, sight-seeing, hiking, and fishing	Off-road Vehicles	Maintaining the campground would preserve opportunities for camping and picnicking and would also support fishing, hiking, sight-seeing and hunting activities through the use of compounds and picnic areas for "base camps".	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
				ORV restrictions would accommodate vehicular access to hunting, fishing and scenic areas.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
	Fire Management	Camping, picnicking, sight-seeing, and hiking	Fire Management	Prescribed burns in the vicinity of the compounds and picnic areas could decrease the users' opportunities for scenery and wildlife. Fuel burner disturbances caused by fighting fires would decrease opportunities for primitive camping and hiking, but could prevent other losses of opportunities for primitive camping, picnicking and hiking caused by large fires.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.
	Access	Camping, hunting, picnicking, sight-seeing, hiking, fishing, snowmobiling, and cross-country skiing	Access	Maintaining present access into the RPA would preserve present opportunities for access to camping, fishing, camping, picnicking, sight-seeing, hiking, snowmobiling, and cross-country skiing values.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

TABLE 4-3 (Cont.) (contd.)

Recreation Management Area	Management Unit	Resource Activity Causing Impacts	Significant Available Resource	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	EXISTING ALTERNATIVE
				Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis
Ogish Creek and Picnic Area	Ogish Hills	Oil and Gas and topsoil/Minerals Exploration and Development	Picnicking and sight-seeing	No oil and gas leasing and no mining restrictions would preserve the picnic area improvements and immediate settings.	No surface occupancy and no mining restrictions would preserve the picnic area improvements and immediate settings.	Same as Alternative A.	Same as Alternative B.
		Recreation	Picnicking and sight-seeing	Maintaining the picnic area would preserve opportunities for sight-seeing of prehistoric resources and picnicking.	Further development of the picnic area could increase opportunities for sight-seeing of prehistoric resources and picnicking.	Same as Alternative A.	Same as Alternative A.
		Off-road Vehicles	Picnicking and sight-seeing	No off-road designations could cause a decrease in opportunities for prehistoric resource appreciation and picnicking through local vehicular disturbances.	Off-road restrictions could preserve present opportunities for prehistoric resource appreciation of picnicking through the prevention of local vehicular disturbances.	Same as Alternative A.	Same as Alternative B.
		Cultural Resources	Picnicking and sight-seeing	No special cultural management could decrease opportunities for prehistoric resource appreciation through the deterioration of prehistoric resources.	Special cultural management could preserve opportunities for prehistoric resource appreciation through the prevention of deterioration of prehistoric resources.	Same as Alternative A.	Same as Alternative B.
		Fire Management	Picnicking and sight-seeing	Full suppression would protect picnic area improvements, but bulldozing use causing disturbances near the picnic area could decrease opportunities for prehistoric resource appreciation through modern surface disturbances.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
		Access	Picnicking and sight-seeing	Maintaining present access into the RMA would preserve present opportunities for access to picnicking, sight-seeing and hiking values.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

TABLE 4-3 (Continued)

				ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	DISPOSED ALTERNATIVE
Recreation Management Area	Management Unit	Resource Activity Causing Impacts	Significant Available Resource	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis
Whiskey Mountains/ Butte Rock	Whiskey Mountains/ and Butte Rock	Oil and Gas and Locatable Minerals	Hunting	Restrictions and closure of the areas to exploration and development would preserve hunting opportunities. Exploration and development on wild lands and claims causing loss of forage and cover could reduce hunting opportunities due to animal displacement.	Same as Alternative A.	Closing of the areas to exploration and development could decrease hunting opportunities. Exploration and development on causing loss of forage and cover could reduce hunting opportunities due to animal displacement.	Same as Alternative A.
			Camping, hiking and sight-seeing	Restrictions and closure of the areas to exploration and development would help preserve opportunities for primitive camping, hiking and sight-seeing of the scenic wildlife and natural values. These areas remaining open to exploration and development could decrease opportunities for camping, hiking and sight-seeing in primitive scenic and natural lands because of surface disturbances.	Same as Alternative A.	Closing of the areas to exploration and development could decrease opportunities for primitive camping, hiking and sight-seeing of the scenic wildlife and natural values. These areas open to exploration and development could also decrease opportunities for camping, hiking and sight-seeing in primitive scenic and natural lands because of surface disturbances.	Same as Alternative A.
			Snowmobiling	Open exploration and development could increase opportunities for snowmobile access through the construction of new roads. Closure of areas to exploration and development would preserve opportunities for snowmobiling winter wildlife.	Same as Alternative A.	Open exploration and development could increase opportunities for snowmobiling access through the construction of new roads.	Same as Alternative B.
	Fish and wildlife	Hunting	Habitat maintenance and improvements would preserve opportunities for hunting recreations.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	
		Camping, hiking and sight-seeing	Habitat maintenance and improvements would increase opportunities for snowmobiling wildlife for camping, hiking and sight-seeing.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	
		Forestry	Hunting	Limited harvest, which could improve wildlife habitat, could maintain or increase opportunities for hunting in the BSA.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
	Snowmobiling	Camping, hiking, and sight-seeing	Harvesting of timber could decrease opportunities for camping, hiking and sight-seeing of scenic and natural values due to loss of forest cover, construction of access roads, etc.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	
		Snowmobiling	Harvesting in the BSA could increase opportunities for snowmobiling through new access roads.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	
		Landownership Adjustments and Utility Systems	Hunting	Closing of utility systems in Whiskey Mountains would increase vehicular access for hunting recreation but degrade the hunting setting and experience.	Closure of utility systems would maintain present vehicular access and setting opportunity for hunting recreation.	Same as Alternative B.	Same as Alternative B.

TABLE 6-3 (Continued)

				ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	PREFERRED ALTERNATIVE
Recreation Management Area	Management Unit	Resource Availability	Significant Activity/Desiring Resource	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis
Whiskey Mountain and Butte Rock	Whiskey Mountain and Butte Rock	Landscape/Viewsheds and Utility Systems	Camping, hiking and sight-seeing	Closure of utility systems in Butte Rock would preserve scenic and natural values for camping, hiking and sight-seeing. Open utility system development in Whiskey Mountain could decrease opportunities for sight-seeing, camping and hiking in natural and scenic values through new surface disturbances and intrusions.	Closure of utility systems would maintain present scenic values for camping, hiking and sight-seeing, and preserve a natural setting opportunity.	Same as Alternative A.	Same as Alternative B.
			Snowmobiling	Open utility system development in Whiskey Mountain could increase access for snowmobiling recreation through the clearing of new access.	Closure of utility systems would maintain present access for snowmobiling recreation.	Same as Alternative A.	Same as Alternative B.
	Off-Road Vehicles		Hunting	No restrictions on ORV use would preserve access opportunities for hunting recreation, but could decrease hunting opportunities because of animal displacement.	Restrictions on ORV use would limit access opportunities for hunting recreation, but would minimize hunting opportunities through prevention of animal displacement.	Restrictions on ORV use in Butte Rock could decrease access opportunities for hunting recreation.	Same as Alternative A.
			Camping, hiking and sight-seeing	No restrictions on ORV use would preserve vehicular access opportunities for campers and sightseers, but could decrease opportunities for primitive camping, hiking and sight-seeing of natural values.	Restrictions on ORV use would limit vehicular access opportunities for campers and sightseers, but could preserve opportunities for primitive camping, hiking and sight-seeing of natural values.	Restrictions on ORV use in Butte Rock could decrease vehicular access opportunities for campers and sightseers, but could decrease opportunities for primitive camping, hiking and sight-seeing of natural values.	Same as Alternative A.
			Snowmobiling	No ORV restrictions would preserve opportunities for snowmobiling recreational access.	ORV restrictions would limit opportunities for snowmobiling recreational access.	ORV restrictions in Butte Rock could decrease opportunities for snowmobiling recreational access.	Same as Alternative A.
	Fire Management		Hunting	Full fire suppression activities, including bulldozer use, could increase access opportunities for hunter recreation but may decrease opportunities for hunting due to loss of animal habitat and animal displacement.	Same as Alternative A.	Limited fire suppression activities would maintain present access opportunities for hunter recreation, but may decrease opportunities for hunting due to loss of animal habitat and animal displacement.	Same as Alternative B.
			Camping, hiking and sight-seeing	Intensive fire suppression, including bulldozer use, could decrease opportunities for primitive camping, hiking and sight-seeing of natural and scenic values through fire scars and surface disturbances.	Same as Alternative A.	Limited fire suppression could decrease opportunities for primitive camping, hiking and sight-seeing of natural and scenic values through fire scars.	Same as Alternative B.
			Snowmobiling	Intensive fire suppression, including bulldozer use, could increase opportunities for snowmobiling access.	Same as Alternative A.	Limited fire suppression would maintain opportunities for snowmobiling access.	Same as Alternative B.
	Access		Hunting	Maintenance of present access would preserve present opportunities for hunting access.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
			Camping, hiking and sight-seeing	Maintenance of present access would preserve present opportunities for access to scenic and natural areas for campers, hikers and sightseers.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
			Snowmobiling	Maintenance of present access would preserve present opportunities for access to snowmobiling access.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

TABLE 4-3 (Continued)

Recreation Management Area	Management Unit	Resource Activity Overlay Impacts	ALTERNATIVE A		ALTERNATIVE B		ALTERNATIVE C		REFERRED ALTERNATIVE
			Significant Available Resource	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	
Bullock Redlands	Bullock Redlands	Oil and Gas	Hunting	Restriction and closure of the RMA to exploration and development would help preserve hunting opportunities. Exploration and development on wild lands causing loss of forage and increased access could reduce hunting opportunities due to animal displacement.	No surface occupancy and seasonal restrictions in the RMA would help preserve hunting opportunities. Exploration and development causing loss of forage and increased access could reduce hunting opportunities due to animal displacement.	Opening of the RMA to exploration and development could decrease hunting opportunities. Exploration and development causing loss of forage and increased access could reduce hunting opportunities due to animal displacement.	Same as Alternative A.		
			Off-Road Vehicle Use	Exploration and development on wild lands could increase opportunities for OHV use through the construction of new access roads.	Open exploration and development on the RMA could increase opportunities for OHV use through the construction of new access roads.	Same as Alternative A.	Same as Alternative A.		
			Sight-seeing	Closure of much of the RMA to leasing, exploration and development would preserve opportunities for encountering wildlife and for sight-seeing of the natural values of the RMA.	No surface occupancy on some of the RMA would help preserve opportunities for encountering wildlife and for sight-seeing of the natural values of the RMA.	Opening of much of the RMA to leasing, exploration and development could decrease opportunities for encountering wildlife and for sight-seeing of the natural values of the RMA.	Same as Alternative A.		
	Locatable Minerals		Hunting	Open exploration and development with seasonal restrictions could help preserve opportunities for hunting and could provide increased access for hunting recreation. At the same time, loss of forage and increased access into the RMA could decrease hunting opportunities through animal displacement.	Closure of exploration and development with plans of operations restrictions would help maintain opportunities for hunting and would maintain present access for hunting recreation. At the same time, loss of forage and increased access into the RMA could decrease hunting opportunities through animal displacement.	Same as Alternative A.	Same as Alternative B.		
			Off-Road Vehicle Use	Open exploration and development could increase opportunities for OHV use through the construction of new access roads.	Closure of exploration and development would maintain present opportunities for OHV use through the prevention of construction of new access roads.	Same as Alternative A.	Same as Alternative B.		
			Sight-seeing	Open exploration and development could decrease opportunities for sight-seeing of the natural and wildlife values of the RMA. At the same time, opportunities for sight-seeing could be increased by improved access into the RMA.	Closure of exploration and development would maintain present opportunities for sight-seeing of the natural and wildlife values of the RMA.	Same as Alternative A.	Same as Alternative B.		
	Fish and Wildlife		Hunting	Habitat improvements would increase opportunities for hunting in the RMA.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.		
			Sight-seeing	Habitat improvements would increase opportunities for encountering wildlife in the RMA.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.		
	Leakwatering Adjustments and Utility Systems		Hunting	Open utility system development could increase opportunities for hunting access through the construction of new roads.	Closed utility systems would maintain present opportunities for hunting access through the prevention of construction of new roads.	Same as Alternative A.	Same as Alternative A.		

TABLE 4-3 (Continued)

Recreation Management Area	Management Unit	Resource Activity Character Object	Significant Available Resource	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	IMPROVED ALTERNATIVE
				Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis	Management Action and Impact Analysis
Dobson Wetlands	Dobson Wetlands	Landownership Adjustments and Utility Systems	Off-Road Vehicles	Open utility system development could increase opportunities for new ORV activities through the construction of new roads.	Closed utility system would maintain present opportunities for ORV activities.	Same as Alternative A.	Same as Alternative A.
			Sight-seeing	Open utility system development could decrease opportunities for sight-seeing of natural values due to new surface disturbances and limitations.	Closed utility system would preserve opportunities for sight-seeing of natural values.	Same as Alternative A.	Same as Alternative A.
		Off-Road Vehicles	Hunting	No restrictions on ORV use would preserve present access opportunities for hunter recreation. At the same time, no restrictions could decrease hunting opportunities through disturbance and disposal of wildlife.	Closest restrictions on ORV use decrease present access opportunities for hunter recreation. At the same time, closure would increase hunting opportunities through the prevention of the disturbance and disposal of wildlife.	Same as Alternative A.	Same as Alternative A.
			Sight-seeing	No restrictions on ORV use could decrease opportunities for sight-seeing of natural values of the RMA. At the same time, no restrictions could increase access to new areas for sight-seeing.	Closest restrictions on ORV use would preserve opportunities for sight-seeing of natural values of the RMA. At the same time, restrictions would prevent access to new areas for sight-seeing.	Restrictions on ORV use would maintain present opportunities for sight-seeing of natural values of the RMA. At the same time, restrictions would maintain present access to new areas for sight-seeing.	Same as Alternative A.
Dobson Wetlands	Dobson Wetlands	Fire Management	Hunting	Intensive firefighting, including bulldozer use, could increase opportunities for hunting through new firebreak roads.	Same as Alternative A.	Limited firefighting would maintain opportunities for ORV use.	Same as Alternative A.
			Off-Road Vehicles	Intensive firefighting, including bulldozer use, could increase opportunities for ORV use through new firebreak access roads.	Same as Alternative A.	Limited firefighting would maintain opportunities for ORV use.	Same as Alternative A.
		Access	Sight-seeing	Intensive firefighting, including bulldozer use, could decrease opportunities for sight-seeing of scenic and natural values through new surface disturbances.	Same as Alternative A.	Limited firefighting would not affect opportunities for sight-seeing of scenic and natural values.	Same as Alternative A.
			Hunting	Maintenance of present access would preserve present opportunities for access to hunting areas.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
			Off-Road Vehicles	Maintenance of present access would preserve present opportunities for access to ORV areas.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
			Sight-seeing	Maintenance of present access would preserve present opportunities for access to scenic and natural areas.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

## Environmental Consequences

withdrawal designations, plus seasonal, no-surface occupancy and off-road vehicle (ORV) restrictions, would protect surface resources. However, mineral resources in areas closed to mineral activity would not be discovered or developed. Seasonal and no-surface occupancy restrictions could be applied to any oil and gas operations, irrespective of the oil and gas potential occurrence rating of the area. These restrictions, plus ORV restrictions that affect locatable mineral activity, could prevent the mineral resources from being developed in the most timely and efficient manner. Timely and efficient prospecting, exploration, and development operations would continue in areas not closed to mineral activity and in areas without surface restrictions.

### Oil and Gas

The management actions for oil and gas would create both beneficial and adverse impacts to the recovery of oil and gas in the Green Mountain, Beaver Creek, South Pass, Gas Hills, and Dubois Area Management units. Allowing oil and gas operations to proceed would benefit recovery by allowing exploration for and subsequent extraction of oil and gas. Drainage of federal oil and gas reserves by wells drilled on adjacent private and state lands would be avoided. Applying no-surface occupancy restrictions to specific areas within these management units would adversely affect recovery by not allowing surface disturbing geophysical exploration and thus limiting the potential discovery of oil and gas reservoirs, and by mandating directional drilling and thus causing untimely and inefficient development of subsurface resources. Approximately 65,000 acres, or 2 percent of the resource area, would contain area-wide no-surface occupancy restrictions. Seasonal restrictions could also preclude the timely development of the subsurface resources (see table 4-4 and Impacts that are Common to all Alternatives).

Closing the Lander Slope, Red Canyon, East Fork, and Dubois Badlands Management units to new leasing, exploration and development and continuing or adding segregations and withdrawals to the Beaver Creek and Gas Hills units would adversely affect oil and gas by prohibiting the discovery and development of unknown quantities of oil and gas. There would be no protection against potential drainage of federal oil and gas reserves in the East Fork unit.

Keeping the Whiskey Mountain unit closed to leasing, exploration and development would preclude the discovery and development of unknown quantities of oil and gas within the unit.

### Locatable Minerals

The management actions for locatable minerals would benefit the resource by allowing prospecting, exploration and development within all management units. The only areas where the resource would not benefit would be the Dubois Badlands Management Unit, while seasonal restrictions are in effect, and segregated and withdrawn areas in the Green Mountain, Beaver Creek, South Pass, Gas Hills, East Fork, Whiskey Mountain, and Dubois Area Management units (see table 4-5). The seasonal restrictions in the Dubois Badlands unit would temporarily hinder exploration and development of prospectively valuable mineral lands. The segregations and withdrawals in the other units would preclude the opportunity to discover and develop mineral resources in those areas.

Management actions for off-road vehicles that limit vehicular traffic to designated roads and vehicle routes within the Green Mountain, Lander Slope and Red Canyon Management units, and to existing roads and vehicle routes in the Beaver Creek unit, would adversely affect locatable minerals because of the time claimants and prospectors would lose while waiting for approval to use off-road vehicles. Off-road vehicle limitations in the South Pass unit would restrict the rights of ingress and egress of mining claimants and prospectors on public lands.

Management actions that would close the Green Mountain, Lander Slope and Red Canyon Management units to traffic during certain portions of the year would temporarily close these units to the prospecting, exploration and development of the mineral resources.

### Phosphates

The management actions for phosphates would prohibit prospecting permits or leases from being issued in the Lander Slope and Red Canyon Management units. This would preclude low-grade phosphate reserves from being developed in these units. Refer to Impacts Common to All Alternatives for the affects these actions would have on phosphate development.

### Other Actions

Under Alternative A, lands around Sinks Canyon State Park would be withdrawn from mineral entry, thus precluding any mineral resources from being discovered or developed (see map 4-6). A detailed



TABLE 4-4  
OIL AND GAS LEASING AND DEVELOPMENT ESTIMATE  
SUMMARY OF OIL AND GAS POTENTIAL RATING ACREAGE AND LEASING RESTRICTIONS

Assignment Unit and Assignment Alternative	Average Index (Source: Pool #7-100)				Average Index (No Surface Occupancy Restrictions)				Average Index (No Lease Category)				Total (7-1 and 200 Before 64) 207-100 Average				
	High (% of Total)	Medium (% of Total)	Low (% of Total)	No (% of Total)	High (% of Total)	Medium (% of Total)	Low (% of Total)	No (% of Total)	High (% of Total)	Medium (% of Total)	Low (% of Total)	No (% of Total)	High (% of Total)	Medium (% of Total)	Low (% of Total)	No (% of Total)	Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<b>Core Mustangs</b>																	
Alternative A	12,900 (53)	14,000 (70)	31,400 (15)	0	5,120 (2)	7,360 (8)	3,450 (3)	0	0	0	0	0	26,130 (7)	40,120 (29)	72,120 (5)	1,480 (1)	141,800
Alternative B	12,900 (53)	14,000 (70)	31,400 (15)	0	5,120 (2)	7,360 (8)	3,450 (3)	0	0	0	0	0	26,130 (7)	40,120 (29)	72,120 (5)	1,480 (1)	141,800
Alternative C	0	14,000 (70)	31,400 (15)	0	0	0	3,450 (3)	0	0	0	0	0	26,130 (7)	40,120 (29)	72,120 (5)	1,480 (1)	141,800
Preferred Alternative	0	14,000 (70)	31,400 (15)	0	5,120 (2)	7,360 (8)	3,450 (3)	0	0	0	0	0	26,130 (7)	40,120 (29)	72,120 (5)	1,480 (1)	141,800
<b>Source Creek</b>																	
Alternative A	64,200 (23)	70,700 (25)	49,200 (18)	41,400 (1)	4,700 (2)	4,950 (2)	1,700 (1)	7,300 (3)	0	0	0	0	107,500 (3)	20,000 (22)	230,700 (34)	1,260 (4)	1,260,000
Alternative B	64,200 (23)	70,700 (25)	49,200 (18)	41,400 (1)	4,700 (2)	4,950 (2)	1,700 (1)	7,300 (3)	0	0	0	0	107,500 (3)	20,000 (22)	230,700 (34)	1,260 (4)	1,260,000
Alternative C	0	70,700 (25)	49,200 (18)	41,400 (1)	1,200 (1)	700 (1)	2,200 (1)	900 (1)	7,000 (3)	0	0	0	107,500 (3)	20,000 (22)	230,700 (34)	1,260 (4)	1,260,000
Preferred Alternative	0	70,700 (25)	49,200 (18)	41,400 (1)	4,700 (2)	4,950 (2)	1,700 (1)	7,300 (3)	0	0	0	0	107,500 (3)	20,000 (22)	230,700 (34)	1,260 (4)	1,260,000
<b>Leader Slope</b>																	
Alternative A	0	0	16,400 (6)	0	0	0	0	0	0	0	0	0	46,100 (10)	0	0	0	46,100
Alternative B	0	0	16,400 (6)	0	0	0	0	0	0	0	0	0	46,100 (10)	0	0	0	46,100
Alternative C	0	0	16,400 (6)	0	0	0	0	0	0	0	0	0	46,100 (10)	0	0	0	46,100
Preferred Alternative	0	0	16,400 (6)	0	0	0	0	0	0	0	0	0	46,100 (10)	0	0	0	46,100
<b>Hut Canyon</b>																	
Alternative A	0	0	17,000 (6)	0	0	0	0	0	0	0	15,100 (6)	0	0	0	17,000 (6)	0	17,000
Alternative B	0	0	17,000 (6)	0	0	0	0	0	0	0	15,100 (6)	0	0	0	17,000 (6)	0	17,000
Alternative C	0	0	17,000 (6)	0	0	0	0	0	0	0	15,100 (6)	0	0	0	17,000 (6)	0	17,000
Preferred Alternative	0	0	17,000 (6)	0	0	0	0	0	0	0	15,100 (6)	0	0	0	17,000 (6)	0	17,000
<b>South Pass</b>																	
Alternative A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,900	1,540	13,500
Alternative B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,900	1,540	13,500
Alternative C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,900	1,540	13,500
Preferred Alternative	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,900	1,540	13,500
<b>Gas Hills</b>																	
Alternative A	75,200 (3)	62,400 (6)	118,150 (47)	26,000 (5)	430 (1)	1,400 (1)	1,000 (1)	1,700 (2)	4,100 (1)	2,700 (2)	32,970 (12)	250,500 (24)	267,000 (23)	250,740 (25)	250,500 (24)	1,050,400	1,050,400
Alternative B	75,200 (3)	62,400 (6)	118,150 (47)	26,000 (5)	430 (1)	1,400 (1)	1,000 (1)	1,700 (2)	4,100 (1)	2,700 (2)	32,970 (12)	250,500 (24)	267,000 (23)	250,740 (25)	250,500 (24)	1,050,400	1,050,400
Alternative C	0	62,400 (6)	118,150 (47)	26,000 (5)	0	1,400 (1)	1,000 (1)	1,700 (2)	4,100 (1)	2,700 (2)	32,970 (12)	250,500 (24)	267,000 (23)	250,740 (25)	250,500 (24)	1,050,400	1,050,400
Preferred Alternative	0	62,400 (6)	118,150 (47)	26,000 (5)	0	1,400 (1)	1,000 (1)	1,700 (2)	4,100 (1)	2,700 (2)	32,970 (12)	250,500 (24)	267,000 (23)	250,740 (25)	250,500 (24)	1,050,400	1,050,400
<b>Gas Rock</b>																	
Alternative A	0	0	0	0	0	0	0	0	0	0	13,750 (99)	120	0	0	13,750 (99)	120	13,870
Alternative B	0	13,750 (99)	120 (100)	0	0	0	0	0	0	0	13,750 (99)	120	0	0	13,870	0	13,870
Alternative C	0	13,750 (99)	120 (100)	0	0	0	0	0	0	0	13,750 (99)	120	0	0	13,870	0	13,870
Preferred Alternative	0	0	0	0	0	0	0	0	0	0	13,750 (99)	120	0	0	13,870	0	13,870
<b>Badger's Badlands</b>																	
Alternative A	0	0	0	0	0	0	0	0	0	0	11,000	0	0	0	11,000 (100)	1,000 (1)	11,000 (100)
Alternative B	0	4,000 (4)	0	0	0	0	0	0	0	0	11,000	0	0	0	15,000 (100)	1,000 (1)	11,000 (100)
Alternative C	0	4,000 (4)	0	0	0	4,000 (4)	0	0	0	0	0	0	0	0	11,000 (100)	1,000 (1)	11,000 (100)
Preferred Alternative	0	4,000 (4)	0	0	0	4,000 (4)	0	0	0	0	0	0	0	0	11,000 (100)	1,000 (1)	11,000 (100)
<b>Whiskey Mountains</b>																	
Alternative A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,200 (100)	0	8,200
Alternative B	0	0	8,200 (100)	0	0	0	0	0	0	0	0	0	0	0	8,200 (100)	0	8,200
Alternative C	0	0	8,200 (100)	0	0	0	0	0	0	0	0	0	0	0	8,200 (100)	0	8,200
Preferred Alternative	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,200 (100)	0	8,200

Environmental Consequences

TABLE 6-4

Management Unit and Management Alternative	Acreage Under Storage Restrictions				Acreage Under No Surface Occupancy Restrictions				Acreage Under No Storage Restrictions				Total On- and Off-Budget Acreage				
	High (k of Total)	Medium (k of Total)	Low (k of Total)	No (k of Total)	High (k of Total)	Medium (k of Total)	Low (k of Total)	No (k of Total)	High (k of Total)	Medium (k of Total)	Low (k of Total)	No (k of Total)	High (k of Total)	Medium (k of Total)	Low (k of Total)	No (k of Total)	Total
<b>Delta Area</b>																	
Alternative A	880,100	23,800(54)	15,400(34)	0	0	0	190(1)	0	0	0	0	0	880(1)	23,800(54)	15,400(34)	0	940,300
Alternative B	880,100	23,800(54)	15,400(34)	0	0	0	290(1)	0	0	0	0	0	880(1)	23,800(54)	15,400(34)	0	940,300
Alternative C	0	23,800(54)	15,400(34)	0	0	0	0	0	0	0	0	0	0	23,800(54)	15,400(34)	0	39,200
Preferred Alternative	*	23,800(54)	15,400(34)	0	0	0	190(1)	0	0	0	0	0	880(1)	23,800(54)	15,400(34)	0	940,300
<b>Delta Rice Delta Area</b>																	
Alternative A	154,800(34)	166,900(29)	254,000(46)	68,400(14)	10,400(2)	13,700(2)	25,800(2)	14,900(3)	4,100(1)	26,300(3)	63,000(6)	32,900(7)	463,200(7)	612,650(29)	1,078,800(60)	536,900(20)	2,673,175
Alternative B	154,800(34)	167,400(29)	329,900(59)	68,400(14)	10,400(2)	13,700(2)	42,900(4)	8,100(6)	4,100(1)	5,500(1)	9,500(1)	32,900(7)	463,200(7)	612,650(29)	1,078,800(60)	536,900(20)	2,673,175
Alternative C	0(0)	187,400(32)	329,900(59)	68,400(14)	2,100(1)	6,500(1)	68,400(1)	2,100(1)	4,100(1)	2,700(2)	9,500(1)	32,900(7)	0	2,700(2)	9,500(1)	32,900(7)	45,100
Preferred Alternative	*	173,700(30)	311,000(55)	68,400(14)	10,400(2)	15,000(3)	89,400(8)	12,200(6)	6,600(1)	16,500(3)	14,500(2)	32,900(7)	463,200(7)	612,650(29)	1,078,800(60)	536,900(20)	2,673,175
<b>Total</b>																	
Alternative A	446,230(8)	733,700(29)	733,700(29)	75,200(15)	10,400(2)	13,700(2)	25,800(2)	14,900(3)	4,100(1)	26,300(3)	63,000(6)	32,900(7)	880,100(1)	46,600(2)	30,800(1)	0	2,200,330
Alternative B	446,230(8)	733,700(29)	733,700(29)	75,200(15)	10,400(2)	13,700(2)	42,900(4)	8,100(6)	4,100(1)	5,500(1)	9,500(1)	32,900(7)	880,100(1)	46,600(2)	30,800(1)	0	2,200,330
Alternative C	0	187,400(32)	329,900(59)	68,400(14)	2,100(1)	6,500(1)	68,400(1)	2,100(1)	4,100(1)	2,700(2)	9,500(1)	32,900(7)	0	2,700(2)	9,500(1)	32,900(7)	45,100
Preferred Alternative	*	446,230(8)	733,700(29)	75,200(15)	10,400(2)	15,000(3)	89,400(8)	12,200(6)	6,600(1)	16,500(3)	14,500(2)	32,900(7)	880,100(1)	46,600(2)	30,800(1)	0	2,200,330

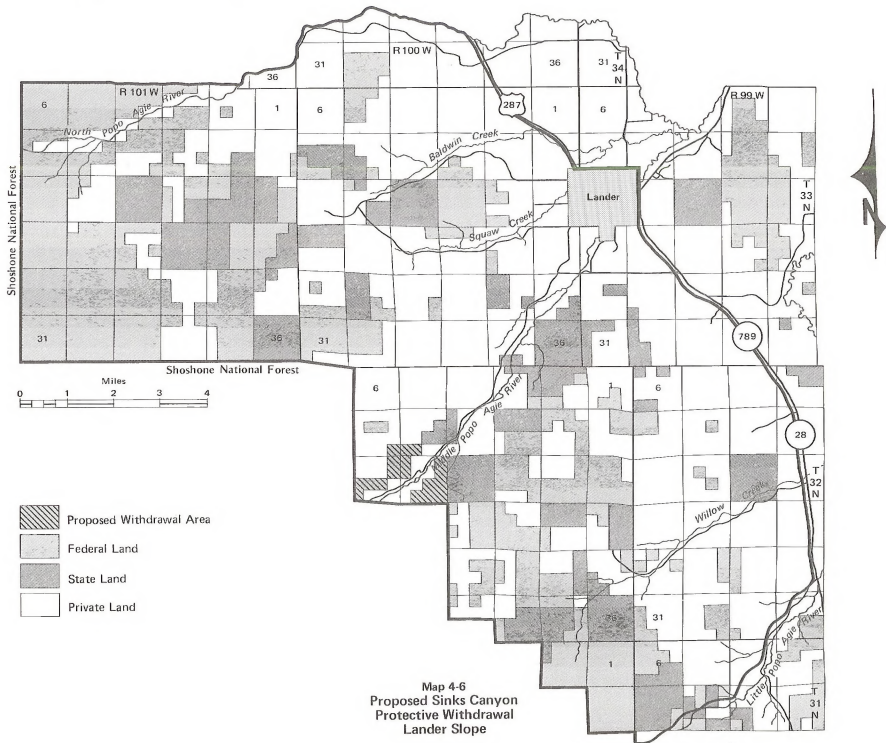
\* See 6-1 and 6-2 for losses to high-potential areas would be considered with no-surface-occupancy and seasonal restrictions on a case-by-case basis and only when necessary to avoid a significant adverse impact on water resources.

1. This figure is the acreage of the preferred alternative (total of all alternatives) for the Sacramento-San Joaquin River Delta.

2. Figures include 4,100 acres in the high-potential category and 2,100 acres in the medium-potential category that are within the Sacramento-San Joaquin River Delta. These areas will be under federal management until a management decision for the Delta is made.

3. No-surface-occupancy restrictions would be applied to all new leases, which would only be issued if needed to protect against discharge of federal oil and gas.

4. Figures include 4,500 acres within the Delta-San Joaquin River Delta. This acreage will be under federal management until a management decision for the Delta is made.



# Environmental Consequences

**TABLE 4-5**  
**LOCATABLE MINERALS MANAGEMENT ACTIONS**

Management Unit and Alternative	Acreage Segregated or Withdrawn from Mineral Location	Acreage Proposed for Withdrawn from Mineral Location	43 CFR 3809 Requirements for Plans of Operation (Acres)
<b>Green Mountain</b>			
Alternative A	120 (C&MU Segr.)	120	0
Alternative B	120 (C&MU Segr.)	120	9 (Sparhawk cabin, proposed)
Alternative C	120 (C&MU Segr.)	120	0
Preferred Alternative	120 (C&MU Segr.)	120	9
<b>Beaver Creek</b>			
Alternative A	1,200 (WDL)	0	0 (Except for valid exist. rights)
Alternative B	1,200 (WDL)	8,370 (Plus select fisheries)	0 (Except for valid exist. rights)
Alternative C	1,200 (WDL)	0	0 (Except for valid exist. rights)
Preferred Alternative	1,200 (WDL)	280	30,690
<b>Lander Slope</b>			
Alternative A	0	0	0
Alternative B	0	46,530	0
Alternative C	0	0	0
Preferred Alternative	0	0	46,530
<b>Red Canyon</b>			
Alternative A	0	0	0
Alternative B	0	17,050	0
Alternative C	0	0	0
Preferred Alternative	0	0	0
<b>South Pass</b>			
Alternative A	1,700 (C&MU Segr.)	17,000 (C&MU Segr.)	0
Alternative B	1,700	15,500 (Includes 1,700 C&MU Segr.)	15,500
Alternative C	0	0	15,500
Preferred Alternative	1,700	0	15,500
<b>Gas Hills</b>			
Alternative A	800 (80 acres C&MU Segr. 730 WDL)	80 (Castle Garden C&MU Segr.)	0
Alternative B	800 (80 acres C&MU Segr. 730 WDL)	680 (Martins Cove & Castle Garden Segr.)	40,000 (Oregon/Mormon Trail Corridor)
Alternative C	800 (80 acres C&MU Segr. 730 WDL)	80 (Castle Garden C&MU Segr.)	0
Preferred Alternative	800	680	40,000

# Environmental Consequences

**TABLE 4-5 (Continued)**  
**LOCATABLE MINERALS MANAGEMENT ACTIONS**

Management Unit and Alternative	Acreage Segregated or Withdrawn from Mineral Location	Acreage Proposed for Withdrawn from Mineral Location	43 CFR 3809 Requirements for Plans of Operation (Acres)
<b>East Fork</b>			
Alternative A	3,400 (WDL)	0	0
Alternative B	3,400 (WDL)	10,455	0
Alternative C	0	0	0
Preferred Alternative	3,400	10,455	0
<b>Dubois Badlands</b>			
Alternative A	0	0	0
Alternative B	0	11,000	0
			(Except for valid exist. rights)
Alternative C	0	0	0
Preferred Alternative	0	0	4,520
<b>Whiskey Mountain</b>			
Alternative A	2,600 (C&MU Segr.)	2,600 (C&MU Segr.)	0
Alternative B	2,600 (C&MU Segr.)	8,200 (Includes 2,600 C&MU Segr.)	0
Alternative C	0	0	0
Preferred Alternative	2,600	8,200	0
<b>Dubois Area</b>			
Alternative A	190 (C&MU Segr.)	190 (Warm Sprs. Canyon C&MU Segr.)	0
Alternative B	190 (C&MU Segr.)	190 (Warm Sprs. Canyon C&MU Segr.)	0
Alternative C	0	0	0
Preferred Alternative	190	0	0
<b>TOTAL</b>			
Alternative A	10,010	4,690	0
Alternative B	10,010	118,095	55,500
Alternative C	2,120	200	15,500
Preferred Alternative	10,010	19,735	15,500
			(13,700 excl. ES)

## Environmental Consequences

description of the segregated and withdrawn areas, plus the areas that would have seasonal and no-surface occupancy restrictions for each energy and mineral resource can be found in Chapter II, Alternatives Including the Proposed Action.

No other management actions under Alternative A would significantly impact energy and mineral resources.

**Conclusion.** Under Alternative A, existing segregation and withdrawal designations, plus seasonal, no-surface occupancy restrictions, would continue to be applied. These actions would adversely impact the short-term (0 to 10 years) productivity of mineral resources, but, since surface restrictions can be modified or eliminated, would not create an irreversible or irretrievable effect to minerals.

### Soils, Water and Air Quality

#### Management Actions for Energy and Minerals

##### Oil and Gas

Under Alternative A all management units would have the potential to be impacted by oil and gas activities, except the Whiskey Mountain Management Unit.

Under the remaining management units open to oil and gas activity, this activity can be divided into three types of operations: exploration, development and reclamation.

The major exploration activity in oil and gas development is seismographic investigations. Impacts associated with seismographic investigations are: vegetative cover destruction, soil compaction, gully and rill erosion, and streambank disturbance. All these impacts would result in accelerated erosion and potentially higher levels of sediment deposited into adjacent streams.

The most significant impacts to soil, watershed and air quality would occur during development of oil and gas resources. Impacts would be similar to those from seismographic activities; however, impacts would generally be concentrated on individual well locations, which average approximately 10 acres in size. An additional problem with site development is salt loading. This is not common, but becomes a significant problem when previously nonsaline soils become saline from

drastic soil disturbance on oil and gas development sites. Salt loading may limit reclamation success by restricting the growth of native species on reclaimed sites.

Most reclamation efforts are directed at reducing accelerated site erosion and establishing native vegetation on disturbed sites. In the short-term it takes an average of 3 to 5 years to establish adequate vegetation to control accelerated erosion on disturbed sites. In the long-term, it takes a substantially longer period of time to establish permanent native vegetation and to increase site fertility. On most disturbed sites, soil characteristics (physical, chemical and biological properties) would not return to their pre-disturbance levels within our lifetimes. This would be an irreversible and irretrievable impact.

Air quality in areas under production could be adversely impacted by vehicle emissions, dust and potentially dangerous gases emitted from producing wells. These impacts might be significant in the short term (during well development and production phases, in a localized area) and insignificant in the long term (following well closure).

The Green Mountain, Beaver Creek, South Pass, Gas Hills, and Dubois Area Management units would have similar impacts under Alternative A. Soil and watershed damage would be minimal, since no-surface occupancy restrictions could be used to protect water quality, fisheries, riparian areas, and steep slopes.

The Lander Slope, East Fork and Dubois Badlands Management units would be closed to new oil and gas leasing, reducing the potential impacts of oil and gas activity.

##### Locatable Minerals

Under Alternative A all management units would be partially or completely open to exploration and development of locatable minerals. With exploration and development of locatable minerals, disturbed lands would be subject to soil compaction and accelerated wind and water erosion. Water quality related values would be affected by increased sediment loads in disturbed watersheds. Air quality values would have the potential to be degraded, depending on the amount of activity from locatable mineral exploration and development and type of mineral.

Because of the seasonal restrictions to protect watershed values in this unit, impacts to the Dubois Badlands Management Unit would be significantly less than in the other units.

## **Environmental Consequences**

Only the Lander Slope and Red Canyon Management units would have the potential to be impacted by phosphate resource development. All other units would not be impacted. Impacts would be similar to those discussed with locatable mineral activity.

### **Management Actions for Fish and Wildlife**

Some improvement in watershed quality and slight reductions in sedimentation would probably occur with management actions for fish and wildlife in the South Pass and Beaver Creek Management units. Slight change would occur in the other management units. Some potential exists for temporary air quality degradation in the immediate area of a prescribed fire.

### **Management Actions for Forestry**

Some impacts from timber harvesting and management would occur on all but the Lander Slope Management Unit. Impacts from timber harvesting would be greatest on the Green Mountain Management Unit. In the short-term, timber harvesting activities could increase erosion associated with logging operations, resulting in increased sediment loads to local streams. Soil compaction would increase the potential for surface runoff, accelerated erosion and increased sedimentation in ditches, landings and skid trails from heavy equipment use. In the long term, timber productivity might be significantly reduced on severely eroded areas.

If slash piles were burned following timber harvesting, soil nutrient enrichment and scarification for seedbed preparation would be a beneficial impact. Short-term degradation of air quality would be expected during slash burning.

### **Management Actions for Access**

In silty and fine sandy loam soil textures, air quality might be degraded during road construction and heavy local traffic. These impacts would be insignificant and restricted to areas of local disturbance.

### **Management Actions for Landownership Adjustments and Utility Systems**

There would be short-term impacts to soil and watershed resources by installation of utility systems until lands had been reclaimed. The major impacts would be increased wind and water erosion and potentially increased sedimentation during construction. Minimum impacts would occur on the Green Mountain, Beaver Creek, Gas Hills, Dubois Badlands, Whiskey Mountain, and Dubois Area Management units where disturbance would be concentrated in existing utility corridors where possible. Significant impacts would be possible on the Red Canyon and South Pass Management units, where utility systems permits would be most available. No significant impacts would occur to the East Fork or Lander Slope Management units because no major utility systems would be allowed on these units.

### **Management Actions for Off-Road Vehicles (ORVs)**

Limited erosion from off-road vehicle (ORV) use would occur on all management units. Impacts to soil and watershed resources would occur during the season of use and for those periods when the soil is not frozen or snow covered. The major impacts would be soil compaction and accelerated wind and water erosion, which would depend on the amount of traffic and how the road was engineered and maintained.

### **Management Actions for Fire**

In all management units, impacts from fire suppression with heavy equipment would occur. Impacts associated with use of heavy equipment include soil compaction, increased wind and water erosion, reduced site productivity, and increased sedimentation. These impacts would have significant short-term effects.

Prescribed burns would adversely affect water quality, accelerate soil erosion and degrade air quality. But, in properly planned prescribed fires, these effects would be minimal and held to acceptable levels. Revegetation, following a prescribed fire, decreases accelerated erosion rates and improves water quality.



## Environmental Consequences

### Management Actions for Soils

In those areas where soil erosion has been accelerated by present management, the degradation would continue until corrective management actions were implemented. The losses in soil fertility and decline in soil condition on localized areas of accelerated erosion would be an unavoidable adverse impact (see the Range Supplement for more details).

Short-term and long-term productivity would be reduced on areas that are being adversely affected by present management. In those areas, a significant reduction in production might occur if soil erosion continued unchecked. The deterioration of soil fertility is a cumulative process; therefore, long-term declining productivity would far exceed short-term declines. In those areas where corrective management has been implemented, a significant improvement of soil resources would occur where the soils have the potential to improve. Areas now at their potential would not change.

All of the management units have some level of erosion. Without corrective measures those rates would not decrease, but would continue until proper conservation measures were implemented. No action implies minimal to no implementation of conservation measures. Therefore, soil erosion and sediment yields would continue at present or higher rates with this alternative. This would result in soil losses in some areas and sediment deposition in others, which would permanently affect soil resources. If more fertile topsoil were lost by erosion, lower soil productivity would result in localized areas. If more fertile topsoil were deposited, following erosion, soil productivity might increase. In some areas of deposition, production might decline because of excess deposition over plant growth. Overall, the loss of fertile topsoil on areas now receiving improper management would result in cumulative increases in erosion rates and sediment yields that exceed present rates.

### Fish and Wildlife

#### Management Actions for Energy and Minerals

##### Oil and Gas

Under Alternative A, management actions for oil and gas would be similar for Green Mountain,

Beaver Creek, South Pass, Gas Hills and Dubois Area Management units. These five units, totaling approximately 2,674,000 acres, would be open to oil and gas leasing. No-surface occupancy stipulations would protect important riparian areas, sage grouse strutting grounds, and known habitat for threatened and endangered species. Seasonal restrictions would protect big game winter ranges, elk calving areas, sage grouse nesting habitat, and raptor nesting sites. For the Green Mountain Management Unit, the elk crucial winter range on the north slope would be protected with a no-surface occupancy stipulation.

No-surface occupancy stipulations designed to protect water quality, fisheries, steep slopes, and riparian areas would result in significant beneficial impacts to fish, waterfowl, game birds, beaver, big game, and a wide variety of birds and other animals. The high-priority standard habitat sites associated with riparian areas and steep slopes would also be protected from oil and gas disturbances. These no-surface occupancy stipulations would protect 53,000 acres (2 percent) of wildlife habitat in the five management units.

The use of seasonal restrictions would provide long-term benefits to big game on crucial winter ranges, elk on calving areas, sage grouse on strutting grounds, and raptors during the nesting periods by eliminating stress, disturbance, and displacement caused by oil and gas activities. Seasonal restrictions during critical periods might help reduce mortality, ensure reproductive success and survival of young, and reduce conflicts with adjacent landowners caused by displaced animals.

Raptors and prairie-dog colonies have not been thoroughly inventoried on these five management units. Until inventories have been completed, there would be a potential for oil and gas to cause a significant short-term adverse impact to local raptor populations. Prairie-dog colonies not previously located probably would be found during the processing of the application for permit to drill (APD). Black-footed ferret searches could then be completed before any surface disturbance occurred, greatly reducing the likelihood of adversely impacting black-footed ferrets.

In the Green Mountain Management Unit, a comparison of the overlap between elk winter range, elk calving areas, mule deer crucial winter range, and areas of high or moderate oil and gas potential indicated that significant long-term impacts to elk and mule deer herds could occur from habitat losses caused by oil and gas activities over the next 60 years.

## Environmental Consequences

In the Beaver Creek Management Unit, a comparison of the overlap between high and moderate potential oil and gas areas and high-value big game and sage grouse habitats indicated that the projected habitat losses might cause serious long-term impacts to the Lander moose herd, the Hall Creek mule deer herd, the Sweetwater and Fremont antelope herds, and sage grouse nesting areas over the next 60 years.

The same comparison in the Gas Hills Management Unit indicated that the Badwater, Beaver Rim, and Rattlesnake mule deer herds, the Badwater and Fremont antelope herds and sage grouse nesting habitat could be significantly impacted from habitat losses caused by oil and gas activities over the next 60 years.

In the Dubois Area, the Wind River antelope herd, the Wind River moose herd, the Badlands bighorn sheep herd, the Wiggins Fork elk herd, and the Dubois mule deer herd could suffer significant adverse impacts from habitat losses caused by oil and gas activities in high and moderate potential areas over the next 60 years.

In the South Pass Management Unit, significant acreages of lodgepole pine forest and aspen conifer woodland habitat types could be disturbed, which would cause significant long-term impacts to moose and elk.

Under Alternative A, three management units, East Fork, Whiskey Mountain and Lander Slope, would remain closed to oil and gas leasing, exploration and development. Significant long-term benefits to big game, game birds, waterfowl, beaver, fish, and a variety of other animals would result from closing these units to oil and gas leasing. The high-value big game winter ranges in the Lander Slope and Red Canyon Management units that support unusually high concentrations of elk, moose, deer, and bighorn sheep, as well as habitat for bald eagles, cliff nesting sites for raptors and several quality trout streams, would be protected from oil and gas disturbances. This protection would provide long-term benefits to these species.

The Whiskey Mountain bighorn sheep herd, which is the largest herd in the continental United States and is nationally significant, would be protected from oil and gas disturbances, resulting in significant long-term benefits to this population.

The East Fork and Dubois Badlands Management units would be closed to new leasing, but exploration and development of existing leases would be permitted. Closing these units to new leasing would protect important big game ranges,

stream fisheries and several high-priority standard habitat sites, resulting in significant long-term benefits.

If drilling occurred on existing leases, habitat losses could be relatively small and still cause significant long-term adverse impacts for fisheries and big game populations, particularly elk and bighorn sheep.

Conclusion. The five management units open to oil and gas leasing could suffer significant declines in big game populations over the next 60 years because of losses of important habitats. No-surface occupancy and seasonal stipulations would benefit fish, waterfowl, game birds, beaver, big game, and a variety of other animals.

Closing the Lander Slope, Red Canyon and Whiskey Mountain Management units to oil and gas leasing would provide significant long-term benefits to big game, game birds, waterfowl, beaver, fish, and a variety of other animals.

Significant long-term adverse impacts could occur to elk, bighorn sheep and other species if existing leases were developed in the Dubois Badlands and East Fork Management units. Otherwise, closing the units to new leasing would provide significant long-term benefits to wildlife, especially big game.

### Locatable Minerals

Under Alternative A, the Lander Slope and Red Canyon Management units would be open for exploration and development of locatable minerals. Although the apparent potential for significant exploration of locatable mineral resources on the Lander Slope and Red Canyon Management units is low, if exploration were to occur, the potential for severe negative impacts on the concentrated high-value fish and wildlife resources, particularly big game winter habitat, would be very high. This action would expose the wildlife resources to the more chronic, continuous habitat losses, and stress and displacement effects generated by small scale, constant, and sometimes highly speculative prospecting, claim staking and assessment activities. These activities might never result in real mineral development but over time cause deteriorated habitats and other negative effects on fish and wildlife.

The Dubois Badlands Management Unit would also be open but would have seasonal restrictions to help protect watershed and wildlife values. Potential for locatable mineral exploration and development is low; however, if such activity did

## Environmental Consequences

occur, even relatively limited habitat losses could cause significant negative effects on the big game populations. The small resident bighorn sheep population would be especially vulnerable, both from loss of the very limited habitat and from the effects of stress and displacement during winter and lambing seasons. The Badlands are also the key to the winter survival of the Wind River antelope herd and part of the Dubois mule deer herd. Any extensive locatable mineral activity in the Badlands would cause significant losses to the big game populations.

The remaining seven management units would be open, except for specific campgrounds, picnic areas, historical sites, and lands already segregated from mineral entry. In the Green Mountain Management Unit, uranium exploration and development might cause significant losses of crucial winter and winter/yearlong elk and mule deer ranges, and in trout habitat in the Willow Creek and Cottonwood Creek drainages over the long term. Elk and trout populations might be lost entirely. The degree of impact on fish and wildlife would be highly dependent on the amount of habitat losses and stress, disturbances, and displacement effects that occur along the lower north slopes of the mountains.

In the Beaver Creek Management Unit, uranium mining has occurred on the eastern edge and southern portion of the unit. If extensive development of the Ogle Petroleum or Lost Creek deposits occurred, only sage grouse and raptors would be significantly impacted. If extensive development of zeolites occurred, depending on where it occurred, many raptor nesting sites could be abandoned and as much as 5 percent of the winter ranges supporting the Hall Creek mule deer herd and 1 percent of the winter ranges supporting the Beaver Rim mule deer herd could be lost.

Part of the Atlantic City Mining District overlaps the southwest part of this management unit. Gold mining activity has been going on in this area for over 100 years. Most operations are relatively small, but they continue to damage or destroy important fish and wildlife habitats. Operations on placer mining claims cause loss of trout fisheries, beaver habitat and crucial winter and winter/yearlong moose habitat associated with riparian zones. Many other wildlife species would be affected where the high- or moderate-priority standard habitat sites were lost. Long-term damage has occurred to these habitats. The areas of open aquatic, willow floodplains, wetland, subirrigated meadow, cottonwood floodplain, aspen-conifer woodland, and lodgepole pine forest standard habitat sites remaining intact are

extremely important to many species. If gold mining activities continued to erode, these high-value habitats, trout fisheries, the Lander moose herd, the beaver pond ecosystems, and the populations of many other wildlife species would suffer significant cumulative negative effects.

Uranium exploration drilling activity has created some new, dependable water sources that have had beneficial effects on antelope and sage grouse. Some of these waters have increased use of previously under-used spring/summer/fall habitats, which might have helped increase annual production of young.

The South Pass Management Unit would be open to the exploration and development of locatable minerals, with the exception of those areas currently segregated from mineral entry. These areas would be withdrawn. Gold and iron are the two major mineral resources in this area. Iron mining operations would probably not occur in the foreseeable future since a large mine just outside the management unit recently shut down permanently (refer to: wildlife maps in Chapter III, Affected Environment; also refer to: General Analysis - Impacts of Locatable Mineral Development Activities on Fish and Wildlife, area wide, this chapter).

Gold mining activity has been going on in this area for over 100 years. Most operations have been relatively small, but accumulatively, they continue to damage or destroy important fish and wildlife habitats. Operations on lode and placer mining claims cause loss of trout fisheries, beaver habitat, and crucial winter and winter/yearlong moose habitat associated with riparian zones. Many other wildlife species have been affected where the high- or moderate-priority standard habitat sites have been lost. Much long-term damage to these habitats has already occurred. The areas of open aquatic, willow floodplain, wetland, subirrigated meadow, limber pine woodland, aspen-conifer woodland, and lodgepole pine forest standard habitat sites remain intact and are extremely important to many species. If gold mining activities continue to erode these high-value habitats, trout fisheries, the Lander moose herd, the beaver pond ecosystems, and the populations of many other wildlife species would suffer significant negative effects.

About 1,700 acres of these high-value-wildlife habitats have been segregated and would be withdrawn under this alternative. This is estimated to include about 10 to 15 percent of the acreage supporting the high-value habitats and fish and wildlife species discussed above. Withdrawal of the currently segregated lands would ensure that

## Environmental Consequences

at least minimal representation of the high-value habitats and associated fish and wildlife resources would continue to occur in the management unit.

In the Gas Hills Management Unit, past wildlife habitat losses from uranium exploration and mining have been extensive. Because of the location of the uranium reserves, future habitat losses would adversely impact mule deer, antelope, sage grouse, and raptors the most.

Assuming that the uranium industry revives, several thousand additional acres of crucial winter and winter/yearlong mule deer range and crucial antelope winter range could be disturbed. This would affect populations in the Beaver Rim deer herd unit and the Fremont antelope herd unit. Losses in these high-value winter ranges would vary from 3 to 5 percent of the total range. Two sage grouse leks and several nesting areas could be lost or negatively affected, causing reduced sage grouse populations locally. Several documented raptor nests and prairie-dog colonies could also be lost.

Mining activities in the Gas Hills Mining District and uranium exploration drilling in the Copper Mountain Mining District have resulted in creation of some new, dependable water sources that have had beneficial effects on some wildlife species, primarily antelope and sage grouse. Some of these waters have increased use of previously under-used spring/summer/fall habitats and may have helped increase annual production of young.

Approximately 10,394 acres of the East Fork Management Unit would be open to locatable mineral exploration and development under this alternative. The 3,432 acres already withdrawn from mining under the Coordination Act would remain closed. Based on current minerals inventory information, no locatable mineral deposits of significant value occur on the management unit.

With nearly three-quarters of the East Fork Management Unit open to locatable mineral activities, many potentially serious impacts from exploration, assessment work, development, and mining could occur. With the high concentrations and restrictive nature of the big game populations depending on the unit, even relatively limited speculative and exploratory operations could still cause serious problems, especially with elk management. The fish and wildlife resources that would be affected, and many of the ways in which they would be affected by locatable mineral development activity, are similar to those described for oil and gas activities. (See the discussion of oil and gas effects on fish and wildlife resources in the East Fork Management Unit.)

Retaining withdrawal on the 3,432 acres in the unit would significantly benefit fish and wildlife by not allowing physical habitat losses to occur on these areas. The withdrawn lands, however, are broken into a number of tracts separated by lands that would be open to locatable mineral development under this alternative. Habitat losses through the effects of behavioral avoidance zones and the effects on big game species from stress, disturbance, and displacement would significantly reduce the value of the withdrawn lands as protected habitat. Nearly all of the stream and riparian habitat on Bear Creek, Wiggins Fork and the majority of the high- and moderate-priority standard habitat sites are not included in the withdrawn lands and receive no protection from the effects of locatable mineral activities under this alternative.

The Whiskey Mountain Management Unit (Whiskey Mountain bighorn sheep winter range) would be open for exploration and development of locatable minerals under this alternative, except for about 2,600 acres presently segregated from mineral entry. Based on current minerals inventory information, no locatable mineral deposits of significant value occur on the Whiskey Mountain Management Unit.

With nearly three-quarters of the Whiskey Mountain Management Unit, including parts of the Torrey Rim and Sheep Ridge preferred sites, open to locatable mineral activities, many potentially serious impacts from exploration, assessment work and development could occur. Habitat in the unit is essentially occupied by bighorn sheep, elk, and the other big game animals in a sensitive balance. Even relatively limited exploratory locatable mineral operations could cause serious problems from stress and displacement or from habitat loss, if activities occurred in one of the preferred sites. If a locatable mineral deposit were discovered and any significant developments were to result, as much as two-thirds of this unique bighorn sheep herd could be lost. Of major concern with any extensive development in the bighorn winter range would be the increased potential for a catastrophic die-off. The effects of locatable mineral development on the bighorns and other wildlife in this unit are similar to those that could occur as a result of oil and gas development.

Establishing a withdrawal on the approximately 2,600 acres currently segregated would provide significant beneficial effects in the protection afforded to at least part of the Whiskey Mountain bighorns and some wintering elk, mule deer and moose.



## Environmental Consequences

Under Alternative A, the Dubois Area Management Unit would be open for locatable mineral exploration and development with the exception of the Warm Springs Canyon area. Based on current inventory information, there are no known locatable mineral deposits that have development potential and no current interest in development here.

Although it does not appear that locatable mineral development would occur, if a significant amount of exploration and development activity did take place in high-value habitats, some fish and wildlife resources would be negatively affected. Habitat losses and displacement caused by placer mining in streams and riparian areas could be especially detrimental to moose, fisheries, water quality, and a variety of species dependent on the riparian associated high-priority standard habitat sites.

Any additional habitat losses and stress/displacement impacts occurring in crucial mule deer winter range or preferred fawning areas (several of the high- and moderate-priority standard habitat sites) could cause further reductions in the Dubois mule deer herd.

**Conclusion.** Under Alternative A, the Lander Slope and Red Canyon Management units could suffer significant long-term impacts to a variety of fish and wildlife resources if exploration and development occurred. In the Dubois Badlands, the risk of impacting the resident bighorn sheep herd and other big game species would be greatly increased. Significant long-term impacts could occur to elk and trout in the Green Mountain Management Unit; sage grouse, raptors, mule deer, and trout in the Beaver Creek Management Unit; trout and moose habitat in the South Pass Management Unit; mule deer, antelope, sage grouse, and raptors on the Gas Hills Management Unit; elk on the East Fork Management Unit;

bighorn sheep on the Whiskey Mountain Management Unit; and moose, mule deer, trout, and high-priority habitat types in the Dubois Area Management Unit.

### Phosphates

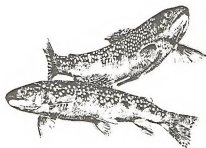
Closing the Lander Slope and Red Canyon Management units to new phosphate prospecting permits and leases would provide significant long-term benefits to the variety of fish and wildlife species discussed in the oil and gas section. Closing the lands around the Sinks Canyon State Park would be particularly beneficial to the small population of bighorn sheep, as well as raptors and other species.

### Management Actions for Fish and Wildlife

Under Alternative A, existing fish and wildlife habitat improvements would be maintained and routine habitat improvement projects would be completed to enhance and maintain fish and wildlife resources. These actions would result in significant long-term benefits to many fish and wildlife species and their associated habitats.

In the South Pass and Beaver Creek Management units, special emphasis would be placed on improving fisheries habitat, resulting in long-term benefits to both fish and wildlife associated with riparian habitat.

In the Red Canyon Management Unit, forage would be reserved for wintering elk. This action would provide significant long-term benefits to the Lander elk herd, which depends on this area for winter forage.



## Environmental Consequences

Management priority in the East Fork Management Unit would be for elk. Bighorn sheep would be the focus of management efforts on the Whiskey Mountain Management Unit. Both of these management efforts would not only benefit elk and bighorns, but many other wildlife species as well. Benefits would be significant and long term.

Conclusion. Under Alternative A, fish and wildlife management actions would significantly benefit wildlife on all management units, with special emphasis on particular fish and wildlife species on specific management units.

### Management Actions for Forestry

Under Alternative A, the most intensive timber harvesting and management would occur on the Green Mountain Management Unit. At the present level of harvest (750 to 1,000 MBF sawtimber and 1,500 to 1,700 MBF other products), utilizing the proposed harvest restrictions, there would be a beneficial long-term impact on elk and deer by the rejuvenation of timber stands and the creation of desirable forage areas.

Maintaining the 40 percent to 60 percent cover-forage ratio and closing roads as soon as possible after timber sales are terminated would especially benefit elk.

The deterioration of the old growth timber stands because of the mountain pine beetle epidemic has created adverse impacts on many bird and small game species that are dependent on this type of habitat. It has also created near optimum conditions for other species. The salvage harvest of the dead material would eventually recreate a mosaic of age classes, which would benefit some species and adversely affect others.

Limited timber harvesting and management on the Beaver Creek, Gas Hills, Whiskey Mountain, and Dubois Area Management units would be undertaken with timber sales considered on a case-by-case basis. Because harvestable stands of timber are very limited in the Beaver Creek and Gas Hills units, impacts to wildlife would be negligible. Timber sales in the Whiskey Mountain and Dubois Area Management units would incorporate fish and wildlife needs to maintain or improve habitat conditions.

Presently, the only cutting in the Red Canyon Management Unit is small amounts of poles and firewood by grazing allottees who use these lands. At this insignificant level of cutting, there would

be essentially no impacts on wildlife resources. If there were any impacts, they would probably be beneficial by removing stagnated or dead trees and producing forage while trees were regenerating.

Limited timber harvesting would be allowed in the South Pass Management Unit, resulting in small, isolated tract sales. Management would emphasize protection and improvement of fish and wildlife values. Cutting decadent aspen stands would benefit fish, beaver and moose. Keeping clearcuts small would ensure adequate cover for moose and elk.

Timber harvesting on the East Fork Management Unit would be allowed only where it was compatible with maintaining the integrity of the elk crucial winter range. This action would benefit elk and other wildlife by ensuring a proper ratio of cover to forage.

Forest resources are so limited in the Dubois Badlands that no impacts to fish and wildlife are anticipated.

The present situation of no timber harvesting on the Lander Slope Management Unit is generally a beneficial impact in the short term. Cover is not being disturbed, forage vegetation is not being lost to road construction and other surface disturbances (human and machine activities associated with timber harvest) are not disturbing wildlife during periods of stress.

However, opportunities to enhance wildlife habitat by creating more mixed-age forests, more edge effect and more diverse forage communities are being forgone. Also, some increased public use of wildlife resources are not being realized. These would be adverse impacts.

The timbered areas are stagnating and are ripe for a devastating beetle attack and a large wildfire situation. This could have a short-term adverse impact on the wildlife habitat; however, the long-term impact could be beneficial.

Harvesting timber in the Lander Slope area would generally be an adverse impact in the short term, due mainly to increased public access. However, in the long term, the variety of age classes produced by logging would be a beneficial impact to the habitat. In the long term, if the timber access development did not result in significant increases in overall human activities in the area, the adverse impacts of timber management would be balanced or outweighed by the beneficial impacts.

## Environmental Consequences

### Management Actions for Landownership Adjustments

Under Alternative A no lands in any of the management units would be sold or exchanged and public purpose patents would be issued on a case-by-case basis. No impacts to fish and wildlife resources would occur.

### Management Actions for Recreation

Red Canyon Management Unit is the only unit where recreational activities would have an impact on wildlife resources. Allowing winter access to the Red Canyon Management Unit under Alternative A increases the risk of disturbing wintering big game, particularly elk, which could cause increased stress and displacement to adjacent private lands where hay damage could occur.

### Management Actions for Off-Road Vehicles (ORVs)

In the long term, off-road vehicle management actions under Alternative A would help protect wildlife populations and habitat in the Green Mountain, Lander Slope, Red Canyon, Beaver Creek, and South Pass Management units. Limiting vehicle use to existing roads and trails would help prevent further terrestrial habitat losses and deterioration of fisheries. Seasonal closures in the Green Mountain and Lander Slope Management units would help to reduce stress and disturbance of wintering big game and siltation of fisheries during the spring. Snowmobile restrictions in the Red Canyon Management Unit would be especially helpful in reducing stress and disturbance to wintering elk and mule deer.

Off-road vehicle management actions under Alternative A would adversely affect fish and wildlife resources for the long term in the Gas Hills, East Fork, Dubois Badlands, Whiskey Mountain, and Dubois Area Management units. The availability of habitat would decrease and the quality of some fisheries would decline as new roads and trails developed, causing vegetation losses, disturbance, and stream siltation. Big game populations would be most affected by these impacts in the Dubois Area, Dubois Badlands, East Fork, Whiskey Mountain, and Gas Hills Management units. Fisheries would be most affected in the East Fork, Dubois Badlands and Dubois Area Management units.

### Management Actions for Fire

Under Alternative A, full suppression of wildfires with no equipment restrictions would be recommended. Impacts to fish and wildlife from full suppression of wildfires could be positive or negative. Suppression in high productive, high-priority standard habitat sites would be beneficial to fish and wildlife resources. Suppression in decadent shrub and timber stands would negatively impact many fish and wildlife resources. In large stands of timber where wildfire could burn large expanses of important big game cover, full suppression would usually be beneficial. No equipment restrictions on steep slopes and fragile soils could cause significant fish and wildlife habitat damage.

Prescribed burns would improve habitat in all management units except the Dubois Badlands Management Unit where vegetation is too sparse to sustain a fire.

### Management Actions for Access

Under Alternative A the existing transportation system would be maintained in all 10 management units. In the Green Mountain Management Unit several hundred miles of roads and trails exist. These roads not only represent a loss of habitat but interrupt the use of adjacent habitat by deer and elk. Limiting road maintenance to the existing transportation system would reduce habitat loss associated with new road building and upgrading.

In the Lander Slope Management Unit, maintaining the existing transportation system would be beneficial to wildlife by providing physical access for fish and wildlife harvest, habitat improvement projects and other fish and wildlife management activities.

No impacts to wildlife would occur in the remaining eight management units.

### Forestry

The only management actions that would affect the forestry resources are oil and gas, locatable minerals, fire, and forestry; the remainder of the management actions would have no effect on this resource.

The Green Mountain, Lander Slope and South Pass Management units are the only units with significant forestry resources. The other units



## Environmental Consequences

have extremely small amounts of timber resources and, therefore, would incur no significant impacts from any of the management actions proposed in this RMP/EIS. For these reasons, this discussion only covers the management actions for oil and gas, locatable minerals, fire, and forestry in the Green Mountain, Lander Slope and South Pass Management units.

### Management Actions for Energy and Minerals

#### Oil and Gas

Under this alternative, the Green Mountain area would be open for leasing, exploration and development of oil and gas resources. These activities could have a significant impact on the forestry program, depending on the level of future exploration and development.

**Timber Quantities.** Oil and gas development activities could significantly reduce the amount of timber available for harvest by removing timber in areas not planned for harvest in the immediate future. In some areas this could be beneficial because it would remove nonsalable timber and replace it with new growth through rehabilitation. In other areas on the mountain, this action would create adverse impacts by removing younger healthy, growing stands with the resultant loss of a long period of growth. It could also be an adverse impact if sites were permanently taken out of timber production by oil and gas activities.

**Sustained Yield.** On Green Mountain the oil and gas management action of opening the area to exploration and development could adversely impact the sustained yield by removing timbered areas from the land base.

Oil and gas management actions would have no significant impact on the sustained yield on Lander Slope and South Pass.

**Timber Condition.** On Green Mountain, depending on the level of exploration and development, opening the area to exploration and development of oil and gas could have significant impacts on timber condition. If exploration sites and roads were located in old-growth timber, this dead and dying resource would be removed from the sites. If the sites were rehabilitated after drilling, new growth would improve the condition of the timber stands and would be a beneficial impact.

If the exploration sites were located in regenerated areas, it would be an adverse impact because it would destroy the healthy, vigorous growing stock, and the growth would be lost for the period of exploration or development.

On Lander Slope and South Pass, management actions for oil and gas would have no significant impact on the timber condition.

**Access.** Keeping the areas on Green Mountain open to exploration and development of oil and gas could have a significant impact on access in the area, depending on the extent and level of exploration and development. There are already hundreds of miles of roads in the area that are not being used and have not been rehabilitated and are contributing to soil erosion in the area each year. If the industries instituted a high level of exploration or development again, this would increase the soil erosion potential and have a significant adverse impact. Increased access would also cause a beneficial impact because it would open more areas for the public to cut firewood. This would help to regenerate some areas faster.

On Lander Slope and South Pass, the oil and gas action would have no significant impacts on access.

**Logging and Regeneration.** On Green Mountain, oil and gas activities could have a significant impact on regeneration, depending on the level of exploration and development. By developing minerals, timber lands would be taken out of production.

On Lander Slope and South Pass, these activities would have no significant impact on logging and regeneration.

#### Uranium and Other Locatable Minerals

Impacts from actions for development of uranium and other locatable minerals would be the same as those from development of oil and gas resources.

### Management Actions for Forestry

#### Timber Quantities

Harvesting 2 to 2.5 MMBF per year would deplete the larger timber on Green Mountain within 15 to 20 years and replace it with new growth.

## Environmental Consequences

On Lander Slope there would be no management of the forest resources, which would cause mortality to continue in the large trees because of old age, disease and insect infestation.

On South Pass the harvesting at the present level would remove the remainder of the large timber within 2 to 3 years and replace it with new growth.

### Sustained Yield

On Green Mountain the continued salvage of the dead and dying stands would eventually increase the sustained yield by increasing the growth rate of timber stands.

On Lander Slope the continuation of present management would produce a decline in the sustained yield figures by reducing the growth on all areas because of increased mortality. This would reduce the acres available for calculation of the sustained yield allowable annual cut for the district by approximately 5,000 acres.

On South Pass the forest management actions of utilizing precommercial and commercial thinnings would have a significant impact on sustained yield by increasing the growth rate on areas affected.

### Timber Condition

On Green Mountain the management action of harvesting (harvest level) would improve the general condition of the timber stands by replacing the old-growth stands with regeneration. Attempting to maintain a 40 percent cover to 60 percent open ratio for elk habitat and waiting to harvest large timber adjacent to clearcuts until the regeneration was large enough to provide big game cover, would cause a deterioration in the quality of timber stands. The large trees left adjacent to clearcuts would continue to deteriorate, and regeneration in the clearcuts would be infested with mistletoe from adjacent trees.

Using precommercial and commercial thinnings in younger stands would significantly improve the condition of the timber stands by transferring the growth potential of the land onto the best formed trees and by eliminating the possibility of stagnation in the stands.

On Lander Slope, the forest management action of no action would generally have a deleterious effect on the timber condition because of the increased mortality rate.

On South Pass the forest management action of harvesting at the present level would signi-

fically improve the overall condition of the remaining stands by replacing them with new growth. The mistletoe and beetle activity would be reduced or eliminated.

### Access

On Green Mountain, harvesting 2 to 2.5 MMBF annually adds 2 to 3 miles to the road system every year. This adds a certain amount of soil erosion potential each year, no matter how well the roads are constructed and maintained. This impact, along with the already present soil erosion from the existing roads, especially the Loop Road, creates a significant impact on the soil resource. Increased access would cause a beneficial impact because it would open more areas for the public to cut firewood. This would help to regenerate some areas faster.

On Lander Slope and South Pass, there would be no significant impacts from the management actions associated with forestry.

### Logging and Regeneration

Harvest levels on Green Mountain would have a beneficial impact on the regeneration of specific cut areas, but an adverse impact on the area as a whole. If old-growth stands were not harvested, the growth potential of the land would be wasted until these areas were harvested. The production potential of the land would not be realized on many areas for years.

The management action of attempting to create a 40 to 60 percent ratio of cover to forage and waiting to harvest large trees in stands adjacent to regenerated clearcuts, until the regeneration is large enough to provide big game cover, would have a detrimental effect on the regeneration of the area. Regeneration in clearcuts would become infested with mistletoe before it would be large enough to provide big-game cover. Also, there would be no regeneration produced in the larger stands that were not harvested.

The forest management action of preparing seedbeds for regeneration in harvested areas provides optimum conditions for regeneration. Clearcuts generally show some new regeneration within 2 years, and areas are fully stocked within 6 to 7 years.

Using precommercial and commercial thinnings in younger stands has a significant beneficial impact on regeneration, because it eliminates mistletoe infested trees, transfers the growth potential of the land to the best trees and prevents the stagnation of the stands as they grow older.

## Environmental Consequences

On Lander Slope there would be no significant impact on logging and regeneration.

On South Pass harvesting the old-growth timber stands and replacing them with new growth would have a significant beneficial impact on regeneration by producing much more growth.

### Management Actions for Fire

#### Timber Quantities

Harvesting 2 to 2.5 MMBF per year would reduce the wildfire hazard on Green Mountain by reducing the fuel and breaking up the contiguous stands of timber with clearcuts. The bigger the clearcuts, the more broken up and separated the dead stands would be. Not logging on slopes over 45 percent would have a significant impact on the mountain by leaving dead and dying trees on the areas, which would increase the fire hazard. Delaying harvesting larger trees adjacent to regenerated clearcuts for up to 20 years would cause further deterioration of these old stands and increase the fire hazard.

On the Lander Slope, increased timber mortality would increase the fire hazard.

On South Pass the management actions would have no significant impact on fire.

#### Sustained Yield

The only possible impact of fire on sustained yield for all areas would occur if a wildfire destroyed a regenerated clearcut. This would destroy the growth of the site for several years. In this case, full suppression would be beneficial.

#### Timber Condition

On Green Mountain, Lander Slope and South Pass, the management actions associated with oil and gas and locatable minerals would have no significant impact on fire management.

This alternative could have an adverse impact on the lodgepole pine ecosystem because fire is a natural part of the ecosystem. The reason that these stands are in such poor condition is that fires and harvesting were excluded for a long time. Lodgepole pine needs rejuvenation on a regular basis. This can be done with wildfire, harvesting or prescribed burning. If some of the unharvested areas were burned, the regeneration of these sites could proceed, while still retaining wildlife cover. The timber could be salvaged at a later date.

Full suppression of fires would be a beneficial impact in the Douglas fir stands in the Lander Slope area. These are relatively young, healthy stands, and if a wildfire burned them, the timber would be killed and no natural regeneration would be produced. In order to take advantage of the growth potential of the land in a reasonable time, an expensive planting project would be needed.

The general impact of full suppression of fires in lodgepole pine stands would be an adverse impact, because dead and dying trees would stand for several years and take up vital growing space. Fire would be a fast and inexpensive way of rejuvenating these areas.

#### Access

Full suppression of fires with no equipment limitations could have a beneficial impact, because it would probably create more access to harvest dead and dying timber. It could also have an adverse impact because it would create more potential for soil erosion.

### Cultural/Natural History Resources

#### Management Actions for Energy and Minerals

#### Oil and Gas

This program has standard protective measures (see Chapter II) that should adequately protect many cultural resources. Beyond the standard measures, Alternative A's management actions would cause significant impacts to several important cultural and natural history resources. These impacts would be both adverse and beneficial, depending on the type of management action and the resource involved.

**Beneficial Impacts.** Alternative A would cause beneficial impacts through two forms of oil and gas management actions. No-surface occupancy restrictions would protect nine important cultural and natural history resources through the prevention of oil and gas-related surface disturbances and intrusions. These resources are the Oregon/Mormon Trail corridor (includes the Gilesie Place/Radium Springs site, the Willies Handcart Commemorative site, part of the Rocky Ridge site, part of the Ice Spring Slough site)

## Environmental Consequences

(31,500 acres), the Beaver Rim proposed National Natural Landmark (1120 acres), four historical sites within the South Pass Management Unit (460 acres), and the Warm Spring Canyon Flume, National Bridge and Geyser site (190 acres). Withdrawals denying the leasing of oil and gas would also protect seven important cultural resources through the prevention of oil and gas-related surface disturbances and intrusions. These resources are the Split Rock Landmark (640 acres), the Aspen Grove Campsite (see Wilderness Supplement for a description of this site) (280 acres), part of Rocky Ridge (560 acres), the Red Canyon National Natural Landmark (5760 acres), the Castle Gardens Rock Art site (80 acres), Devil's Gate Landmark (400 acres), and fragile lands along the Oregon/Mormon Trail (320 acres). In addition, the standard protective measures of the oil and gas program would ensure adequate protection of the Sparhawk Cabin. Avoidance of the cabin site and its immediate surroundings by oil and gas operations would be feasible in nearly all cases.

**Adverse Impacts.** Alternative A would cause adverse impacts because of a lack of restrictions around certain important cultural resources. Oil and gas operations conducted on leases on three different resources could adversely impact those resources through modern surface disturbances and intrusions. These endangered resources are the Ice Spring Slough (those portions not covered by the Oregon/Mormon Trail protective corridor) - (600 acres), most of the proposed South Pass National Register Mining District (11,440 acres), and Martin's Cove (600 acres).

The cumulative impacts of Alternative A's oil and gas management actions would generally be beneficial. Sixteen important cultural and natural history resource properties (covering 41,310 acres) would be protected from oil and gas-related impacts by either no surface occupancy or no leasing restrictions. However, three important cultural resource properties (covering 12,640 acres) could be subject to oil and gas-related impacts. This situation would result in protection for a majority of the important affected resources of the resource area, but some important sites would remain in danger of adverse impacts from oil and gas activities.

### Locatable Minerals

This program has limited standard protective measures (see Chapter II) especially for operations disturbing less than 5 acres. As a result, fewer important cultural or natural history resources would be adequately protected by

standard protective measures for locatable minerals operations than by the standard protective measures of most other programs. The management actions in Alternative A would include significant effects on important cultural and natural history resources, some of which would be beneficial, and others could be adverse.

**Beneficial Impacts.** Alternative A would cause beneficial impacts through one form of locatable minerals management action.

Withdrawals that close lands to mineral location and activity would protect 15 important cultural resources through the prevention of all locatable minerals-related surface disturbances and intrusions. These resources are the same ones reported under beneficial impacts for oil and gas.

**Adverse Impacts.** Alternative A could cause adverse impacts because of a lack of restrictions around certain important resources. Mining operations, especially those disturbing less than 5 acres, could adversely impact ten different resources through modern surface disturbances and intrusions. These endangered resources are the Sparhawk Cabin (10 acres), the Oregon/Mormon Trail corridor (those BLM-administered surface lands not covered by protective withdrawals) - (21,700 acres), Ice Spring Slough (1,250 acres), part of the Rocky Ridge site (that area not covered by protective withdrawal) - (280 acres), the Gillespie Place/Radium Springs site (40 acres), Willies Handcart site (40 acres), Beaver Rim proposed National Natural Landmark (1,120 acres), Red Canyon National Natural Landmark (5,760 acres), most of the proposed South Pass National Register Mining District (11,310 acres), and the Martin's Cove site (600 acres).

The cumulative impacts of Alternative A's locatable minerals management actions would be generally adverse. Ten important cultural and natural history resource properties (covering 42,110 acres) would be subject to locatable minerals impacts. Fifteen important cultural resource properties (only covering 3,060 acres) would be protected from mining impacts through no-mining restrictions. This situation would result in continued vulnerability for most of the important affected resource properties of the resource area, although some important properties would be protected.

### Phosphates

This program has standard protective measures (see Chapter II) that should adequately protect many cultural resources. Beyond the standard



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measures, Alternative A's management action would cause significant impacts to one important natural history resource. The impacts would be beneficial on this specific resource. The management action would close phosphate prospecting and leasing and would protect the Red Canyon National Natural Landmark (NNL) through the prevention of phosphate mining-related surface disturbances and intrusions. The Red Canyon NNL covers 5,760 acres. No adverse impacts would occur because of the total prevention of phosphate-related activities.

The cumulative impacts of Alternative A's phosphate management action would be beneficial.

### Management Actions for Landownership Adjustments and Utility Systems

This program has standard protective measures (see Chapter II) that should adequately protect many cultural resources. Beyond the standard measures, Alternative A's management actions would cause significant impacts to several important cultural and natural history resources. These management action impacts would be both adverse and beneficial, depending on the management action and the resource involved.

#### Adverse Impacts

Alternative A would cause adverse impacts through some of the utility system management actions. Major utility systems allowed on nine cultural and natural history resource properties could adversely impact those sites through surface disturbance and visual intrusion. These endangered resources are the Oregon/Mormon Trail corridor (includes the Gilesie Place/Radium Springs site, and Willies Handcart site) - (31,500 acres), Ice Spring Slough site (1,250 acres), the entire Rocky Ridge site (840 acres), Beaver Rim proposed National Natural Landmark (1,120 acres), Red Canyon National Natural Landmark (5,760 acres), South Pass proposed National Register Mining District (11,900 acres), and Devil's Gate Landmark (400 acres).

#### Beneficial Impacts

Landownership adjustments management actions involving retention of BLM-administered lands could beneficially impact one important cultural resource property through the retention of certain lands by BLM. Retention of these lands

would result in the continued protection of important historical trail resources. These resources are part of the Oregon/Mormon Trail, and 1,029 acres with trail resources would be preserved in their present state under this management action.

Standard procedures used in the utility systems management program would, in some cases, ensure avoidance of adverse impacts on certain important cultural resources. Because of the situations of these resources, unfavorable topography, unique location, etc., utility systems would probably not be built near these resources; in that sense, a beneficial effect would occur. The resources likely to be avoided are Sparhawk Cabin (10 acres), Split Rock Landmark (640 acres), the Aspen Grove site (280 acres), Castle Gardens (80 acres), the Warm Spring Canyon Flume, Natural Bridge and Geyser (190 acres), and Martin's Cove (600 acres).

The cumulative impacts of Alternative A's landownership adjustments and utility systems management actions would generally be adverse. Nine important cultural and natural history resource properties (covering 52,770 acres) would be subject to impacts from utility systems. Six important cultural resource properties (covering 1,800 acres) would be protected from utility system impacts, primarily because of their locations. Elements of one more important resource would be retained by BLM and would be protected. This situation would result in continued vulnerability for most of the important affected resources of the resource area, although some important resources would be protected.

### Management Actions for Cultural/Natural History

This program is oriented toward cultural and natural history resource protection, and all special management actions under this program would enhance the protection of selected important cultural and natural history resources. Alternative A would cause beneficial impacts through several special management actions, but could cause adverse impacts through the lack of special actions also.

#### Beneficial Impacts

Management plans would help protect several cultural resource properties through the well thought out management of those resources. The resources would be the Oregon/Mormon Trail

## Environmental Consequences

corridor (including the trail-related sites of the Split Rock Landmark, Ice Spring Slough, Rocky Ridge, Gilesple Place/Radium Springs, Willies Handcart Commemorative site, Devil's Gate Landmark, Martin's Cove, and Burnt Ranch, (if acquired)), Red Canyon National Natural Landmark, and South Pass proposed National Register Mining District (including five historical mining sites).

### Adverse Impacts

Alternative A could cause adverse impacts because of a lack of adequate management at a few important cultural resource sites. Without adequate management, destructive forces (natural and human-caused) could cause deterioration of two cultural resource properties. These properties are the Castle Gardens Rock Art site and the Warm Spring Canyon Flume, Natural Bridge and Geyser site.

In addition to the above, some important cultural and natural history resources would not be given special management but would not be adversely affected. Because of each property's good integrity and protected location, these resources would not suffer from a lack of special cultural/natural history program management at this time. These properties are the Sparhawk Cabin, the

Aspen Grove site, and the Beaver Rim proposed National Natural Landmark.

The cumulative impacts of Alternative A's cultural/natural history management actions would generally be beneficial. Ten important cultural properties would be protected through enhanced management, and three more resources would remain protected despite the lack of enhanced management. Two resource properties would, however, be subject to deterioration because of a lack of adequate management.

Conclusion. Alternative A would impact the affected cultural and natural history resources of the resource area in both adverse and beneficial ways, but would be the least beneficial choice of all the alternatives from a cultural/natural history resource protection viewpoint. Alternative A protects fewer important resources than alternatives B and C in the Oil and Gas, Locatable Minerals, and Landownership programs. The most important resource (the Oregon/Mormon Trail and its sites) in the resource area would not be beneficially impacted for the most part by the Locatable and Landownership management actions. The South Pass Mining District, the second most important resource in the area, would also not be beneficially impacted by the Oil and Gas, Locatable, and Landownership management actions (see table 4-6).

**TABLE 4-6**  
**EFFECTS ON SIGNIFICANT CULTURAL/  
 NATURAL HISTORY RESOURCES**  
**ALTERNATIVE A**

Management Unit	Significant Resources	Management Actions	Resource Protected
Green Mountain	Sparhawk Cabin	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes (1) No  Yes (1) Yes (2)
Beaver Creek	Oregon/Mormon Trail	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No  No Yes (4)
	Oregon/Mormon Trail Sites —		
Beaver Creek	Split Rock Landmark	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes  Yes (1) Yes (4)
Beaver Creek	Ice Spring Slough	Oil and Gas  Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Mostly No (3) No  No Yes (4)
Beaver Creek	Rocky Ridge	Oil and Gas Locatable Minerals  Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Mostly Yes (3)  Yes (1) Yes (4)
Beaver Creek	Gillespie Place/ Radium Springs	Oil and Gas Locatable Minerals, Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No  No Yes (4)
Beaver Creek	Willies Handcart Site	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No  No Yes (4)
Beaver Creek	Beaver Rim Proposed NNL	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No  No Yes (2)
Beaver Creek	Burnt Ranch	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	N/A N/A  N/A Yes (4)
Beaver Creek	Aspen Grove Campsite (an 1824 fur-trappers' campsite in the Sweetwater Canyon - see Wilderness Supplement for details)	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes  Yes (1) Yes (2)



**TABLE 4-6 (Continued)**  
**EFFECTS ON SIGNIFICANT CULTURAL/  
 NATURAL HISTORY RESOURCES**  
**ALTERNATIVE A**

Management Unit	Significant Resources	Management Actions	Resource Protected
Red Canyon	Red Canyon NNL	Oil and Gas Locatable Minerals Phosphates Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No Yes No Yes
South Pass	South Pass Pro- posed National Register Mining District	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Mostly No (3) Mostly No (3) No Somewhat Yes (3)
Gas Hills	Castle Gardens	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes (1) Somewhat Yes (3)
Gas Hills	Oregon/Mormon Trail	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No No Yes (4)
Gas Hills	Oregon/Mormon Trail Sites - Devils Gate Landmark	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes No Yes (4)
Gas Hills	Martins Cove	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	No No Yes (1) Yes (4)
Dubois Area	Warm Spring Canyon Flume, Natural Bridge and Geyser	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes (1) No

(1) - Resource would be protected by standard protection measures.

(2) - Resource would not have special cultural/natural history program management, but would still be adequately managed.

(3) - Part of site would be protected, part would not be protected.

(4) - Managed according to the Oregon/Mormon Trail Management Plan recommendations.

### ALTERNATIVE B

#### Management Actions for Energy and Minerals

Overall, mineral activities would be limited to a greater extent under Alternative B than under Alternative A (see table 4-4). Although the area open to oil and gas leasing would increase, the acreage that would have surface restrictions and that would be closed to locatable mineral activity would also increase. Areas closed to mineral activity would preclude discovery or development. Seasonal, no-surface occupancy, and off-road vehicle restrictions could prevent mineral resources from being developed in the most timely and efficient manner.

#### Oil and Gas

Four and a half percent more acreage would have no-surface occupancy and seasonal restrictions applied under Alternative B than under Alternative A (see Chapter II, Alternatives Including the Proposed Action). The additional acreage would be the result of no-surface occupancy restrictions covering more area in the Beaver Creek and Gas Hills Management units under Alternative B than Alternative A. It would also result from opening the Lander Slope, Red Canyon, Whiskey Mountain, East Fork, and Dubois Badlands units to leasing, exploration and development and applying surface restrictions to areas within these units that were closed to oil and gas activity under Alternative A (see table 4-1). Thus, the adverse effects of not being able to discover oil and gas reservoirs in no-surface occupancy areas, plus the untimely and inefficient development of subsurface resources as a result of directional drilling, would increase (see Impacts to Oil and Gas that are Common to all Alternatives). Area-wide no-surface occupancy restrictions would cover approximately 99,000 acres, or 4 percent of the resource area.

Additional acreage (approximately 100,000 acres) would be open to oil and gas leasing, exploration and development under Alternative B because of the opening of the Lander Slope, Red Canyon, Whiskey Mountain, East Fork, and Dubois Badlands units to oil and gas activity. Thus, the potential to discover and develop oil and gas resources that was denied in these units under Alternative A would exist under Alternative B. In

addition, potential drainage by wells drilled on adjacent private and state lands would be reduced.

#### Locatable Minerals

Under Alternative B, more acreage (approximately 90,000 acres) would be closed to exploration and development of locatable minerals than under Alternative A. The increased acreage would result from added withdrawals in the Beaver Creek and Gas Hills Management units, plus withdrawal of the Lander Slope, Red Canyon, South Pass, Whiskey Mountain, and part of the Dubois Badlands units from the mining laws. The closures would preclude the opportunity to discover and develop the locatable mineral resources in these areas.

Management actions would require a plan of operations for exploration and development of approximately 2 percent of the acreage open to locatable mineral entry. This restriction could cause delays in the development of the mineral resource and could deny use of the most efficient exploration and mining methods. Claimants and prospectors would have to wait for approval to use off-road vehicles. In addition, the rights of ingress and egress of mining claims and prospectors on public lands would be restricted by off-road vehicle limitations in the South Pass unit.

#### Phosphates

The management actions for phosphates would have the same impacts under Alternative B as under Alternative A. By not issuing new prospecting permits or leases, low-grade phosphate reserves in the Lander Slope and Red Canyon Management units would not be developed.

#### Other Actions

The impacts under Alternative B would be the same as under Alternative A. The withdrawal of lands around Sinks Canyon State Park would preclude any mineral resources in the withdrawn area from being discovered or developed.

A detailed description of the segregated and withdrawn areas, plus the areas that would have seasonal and no-surface occupancy restrictions for each energy and mineral resource can be found in Chapter II, Alternatives Including the Proposed Action.

## Environmental Consequences

No other management actions under Alternative B would significantly impact energy and mineral resources.

**Conclusion.** Under Alternative B, existing segregations and withdrawals, plus seasonal, no-surface occupancy, and off-road vehicle restrictions, would limit mineral activities to a greater extent than under Alternative A. These actions would adversely affect the short-term (0 to 10 years) productivity of mineral resources on a larger acreage than under Alternative A. However, these impacts would not be irreversible or irretrievable since surface-restrictions could be modified or eliminated.

### Soils, Water and Air Quality

#### Management Actions for Energy and Minerals

##### Oil and Gas

Under Alternative B all management units would have the potential to be impacted by oil and gas activities.

The impacts from oil and gas activities under this alternative would be more significant on the Lander Slope, Red Canyon, Whiskey Mountain, East Fork, and Dubois Badlands Management units than in Alternative A. Management actions on the remaining management units would not be significantly changed from Alternative A.

Under all management units in this alternative, oil and gas activity may be divided into three main management actions: exploration, development and reclamation.

The major exploration activity of oil and gas development is seismographic investigations. Impacts associated with seismographic investigations are: vegetative cover destruction, soil compaction, gully and rill erosion, and streambank disturbance. All these impacts would result in accelerated erosion and potentially increased levels of sedimentation into adjacent live streams.

The most significant impacts to soil, watershed and air quality occur during development of oil and gas resources. Impacts are similar to those that occur with seismographic activities; however, impacts are generally concentrated on individual well locations, which average approximately 10 acres in size. An additional problem encountered with site development is salt loading. This is not

common but becomes a significant problem when previously nonsaline soils become saline from drastic soil disturbance on oil and gas development sites. Salt loading may limit reclamation success by restricting the growth of native species.

Most reclamation efforts are directed at reducing accelerated site erosion and establishing native vegetation on disturbed sites. In the short-term it takes an average of 3 to 5 years to establish adequate vegetation to control accelerated erosion on disturbed sites. In the long-term, it takes a substantially longer period of time to establish permanent native vegetation and to increase site fertility. On most disturbed sites, soil characteristics (soil physical, chemical and biological properties) will not return to their pre-disturbance levels within our lifetimes. This is an irreversible and irretrievable impact.

Air quality in producing areas could be adversely impacted by vehicle emissions, dust and potentially dangerous gases emitted from producing wells. These impacts might be significant in the short term (i.e., during well development and production phases, in a localized area) and insignificant in the long term (following well closure).

Soil and watershed damage would be minimal since no-surface occupancy restrictions could be used to protect water quality, fisheries, riparian areas, and steep slopes.

##### Locatable Minerals

With Alternative B all management units except Lander Slope, Red Canyon, South Pass, Whiskey Mountain, and East Fork would be open to exploration and development of locatable minerals. With exploration and development of locatable minerals, disturbed lands would be subject to soil compaction and accelerated wind and water erosion. Water quality related values would be affected by increased sediment loads in disturbed watersheds. Air quality values would have the potential to be degraded, depending on the amount of activity from locatable exploration and development.

Overall, the significance of impacts from locatable mineral exploration and development in this alternative would be less than that in Alternative A, as a result of the closure of five management units to exploration and development. Impacts on Green Mountain, Beaver Creek, Gas Hills, and Dubois Area Management units would be similar to those in Alternative A.

## Environmental Consequences

On the Dubois Badlands Management Unit, the significance of impacts on existing locatable mineral claims would be greater than in Alternative A, but less than Alternative A in all other areas since no new claims would be issued.

Impacts from phosphate resource development would be the same as they are in Alternative A for the only two management units affected, Lander Slope and Red Canyon.

### Management Actions for Fish and Wildlife

Some improvement in watershed quality and reductions in erosion rates would be expected with management actions for fish and wildlife in the Beaver Creek, South Pass, and Green Mountain Management Units. Slight change is expected in other management units. Some potential exists for temporary air quality degradation in the immediate area of a prescribed fire.

### Management Actions for Forestry

Some impacts from timber harvesting and management would be expected on all but the Red Canyon Management Unit. Impacts would be greatest on the Green Mountain Management Unit. An increase, compared to Alternative A, in impacts to soil, watershed and air resources would be expected on the Green Mountain, Lander Slope and South Pass Management units. A decrease in impacts from timber harvesting would be expected on the Red Canyon Management Unit compared to Alternative A. No significant change in impacts would be expected on all other management units compared to Alternative A.

In the short-term, on all management units recommended for timber harvesting, this alternative would increase erosion and resultant sedimentation from removal of forest cover and from road disturbance associated with logging operations. Soil compaction would increase the potential for surface runoff, accelerate erosion, and increase sedimentation in roadways, landings, and skid trails from heavy equipment use. In the long term site, productivity might be significantly reduced in compacted areas.

If slash piles were burned following timber harvesting, soil nutrient enrichment and scarification for seedbed preparation would be a beneficial impact in these areas.

### Management Actions for Access

In silty and fine sandy loam soil textures, air quality might be degraded during road construction and heavy local traffic use. These impacts would be insignificant and restricted to areas of local disturbance.

### Management Actions for Landownership Adjustments and Utility Systems

An overall reduction in wind and water erosion and sedimentation would be expected in Alternative B compared to Alternative A, with recommended management actions for utility systems.

Impacts from utility system construction would be the same in this alternative on the Green Mountain, Beaver Creek, Lander Slope, Gas Hills, East Fork Dubois Area, and Whiskey Mountain Management units as they are in Alternative A.

There would be significantly less impact than in Alternative A on the Red Canyon, South Pass and Dubois Badlands Management units in this alternative from utility system construction.

### Management Actions for Off-Road Vehicles (ORVs)

Overall, a slight reduction in erosion from ORV use would occur in Alternative B compared to Alternative A, because of the closure of the Dubois Badlands Management Unit to ORV use. Impacts to soil and watershed resources would occur during the season of use and when the soil is not frozen or snow covered. The major impacts would be soil compaction and accelerated wind and water erosion, which would depend on the amount of traffic and how the road has been engineered and maintained.

### Management Actions for Fire

Impacts to soil and watershed resources would be less from fire suppression operations in this alternative than in Alternative A, with limited or restricted use of heavy equipment. As was the case in Alternative A, impacts associated with use of heavy equipment include soil compaction, increased wind and water erosion, reduced site productivity, and increased sedimentation. These

## Environmental Consequences

impacts would have significant short-term effects on the affected areas.

In Alternative B, where additional acreage might be burned because of limited use of heavy equipment, two significant impacts might occur. One would increase potential for soil erosion until vegetation has been reestablished, and the other would cause a significant reduction in site productivity on some areas damaged by intense wild fire, e. g., in areas of high soil/OSS. These impacts would be significant in the short term or long term depending on extent and location of wildfires. Local air quality would be degraded during a fire, which would be a short-term impact.

### Fish and Wildlife

#### Management Actions for Energy and Minerals

##### Oil and Gas

Management actions for the oil and gas program for the Green Mountain, Beaver Creek, Gas Hills, and Dubois Area Management units would be the same as Alternative A. The units would be open to oil and gas leasing, exploration, and development with no-surface occupancy and seasonal stipulations to protect important wildlife impacts to fish and wildlife. In these management units, no-surface occupancy and seasonal stipulations would benefit big game, fish, waterfowl, game birds, beaver, and many other fish and wildlife species associated with streams and riparian habitats.

In the Green Mountain Management Unit, significant adverse impacts could occur to the elk and mule deer herds over the next 60 years from habitat disturbances in high- and moderate-potential oil and gas areas.

In the Beaver Creek and Gas Hills Management units, significant habitat losses over the next 60 years would adversely affect mule deer, antelope and sage grouse. The Dubois Area Management Unit could suffer significant moose, elk, deer, and bighorn sheep herd losses over the next 60 years from oil and gas activities.

Better raptor and prairie-dog colony inventories would be needed to avoid adverse impacts to raptors and possible black-footed ferrets in all four

of these management units. For the South Pass Management Unit, impacts to wildlife from oil and gas activities would be similar to Alternative A, except that the crucial moose habitat would be protected with a no-surface occupancy stipulation. This action could provide a significant long-term benefit to the wintering moose population, since this area is heavily used by a large portion of the Lander moose herd. Elk could also benefit since there is some overlap in moose and elk ranges.

The Lander Slope, Red Canyon, Whiskey Mountain, East Fork, and Dubois Badlands Management units would be open to oil and gas leasing, exploration and development with no-surface occupancy stipulations to protect water quality, fisheries, riparian areas, sage grouse breeding areas and threatened and endangered species. Seasonal restrictions would be used to protect big game crucial winter ranges, elk calving areas, sage grouse nesting areas and raptor nesting sites.

Significant long-term adverse impacts could occur to elk, mule deer, moose and bighorn sheep on the Lander Slope and Red Canyon Management units from habitat disturbance and increased access caused by oil and gas exploration and development.

The use of no-surface occupancy restrictions on streams and riparian areas in the Lander Slope and Red Canyon Management units would provide significant benefits through protection of moose habitat, fisheries (in seven streams and their tributaries), water quality, bald eagle winter roost areas (cottonwood floodplains), and several riparian associated high-priority standard habitat sites (wetlands, subirrigated, cottonwood floodplains, willow floodplain).

No-surface occupancy restrictions on soils on steep slopes would protect raptor nesting habitat on many cliff sites and bighorn sheep escape cover, and some crucial habitat on steep canyon slopes. Also, some high-priority standard habitat sites would be protected by slope restrictions.

Seasonal restrictions on exploration activities would protect wintering big game from the effects of stress, disturbance and displacement from geophysical and exploration activities. These restrictions would not be in effect to protect wildlife should production be established or field or mine development become a reality.

Opening the East Fork Management Unit to oil and gas leasing, exploration and development



## Environmental Consequences

could cause significant long-term adverse impacts to elk and bighorn sheep. Habitat and forage losses could cause shifts in elk distribution, causing increased competition with other big game or displacement off the unit where conflicts with livestock and ranchers could occur.

Oil and gas leasing, exploration, and development in the Whiskey Mountain Management Unit could severely impact the bighorn sheep herd, especially if road building and pad construction occurred on one of the preferred wintering sites. A relatively small amount of habitat loss could significantly impact the bighorn population by increasing stress, disturbance and displacement factors.

No-surface occupancy restrictions would benefit riparian habitat, aquatic habitat and some bighorn sheep escape cover. Seasonal restrictions would benefit bighorn sheep, elk, moose, and mule deer on crucial winter and winter/yearlong ranges and raptors during nesting periods by eliminating stress and disturbance caused by oil and gas activities.

Major impacts from oil and gas activities in the Dubois Badlands would be disturbance of the resident bighorn sheep population and the wintering elk herd, and increased sedimentation in the Wind River, which would degrade aquatic habitat. The Wind River antelope herd and a portion of the Dubois mule deer herd could also be significantly impacted from these activities.

No-surface occupancy stipulations on a small stretch of the Wind River would protect winter moose habitat, fisheries and the cottonwood floodplain high-priority habitat type.

Conclusion. In the Green Mountain, Beaver Creek, Gas Hills, and Dubois Area Management units, no-surface occupancy and seasonal restrictions would help protect big game, fish, waterfowl, game birds, beaver, and many other fish and wildlife species. However, significant adverse impacts could occur to big game herds in these units over the next 60 years because of habitat losses over the majority of these units that are open to oil and gas leasing.

In the South Pass Management Unit, impacts to wildlife would be similar to Alternative A, except that the crucial moose habitat would be protected with a no-surface occupancy stipulation.

Opening the remaining units to oil and gas development would significantly impact big game herds.

### Locatable Minerals

Under Alternative B, impacts to wildlife would be the same as under Alternative A for the Dubois Area, Green Mountain, Beaver Creek, and Gas Hills Management units. Briefly summarized, significant long-term adverse impacts could occur to moose, mule deer, trout, and high-priority habitat types in the Dubois Area Management Unit; elk and trout in the Green Mountain Management Unit; sage grouse, mule deer and trout in the Beaver Creek Management Unit; and mule deer, antelope, sage grouse, and raptors in the Gas Hills Management Unit.

The Lander Slope, Red Canyon, South Pass, and Whiskey Mountain Management units, as well as portions of the East Fork Management Unit not already withdrawn, would be closed to exploration and development of locatable minerals. The exceptionally high-value fish and wildlife resources in these units would not be exposed to the negative impacts of mineral exploration and development activities discussed under Alternative A. Significant long-term benefits to many fish and wildlife resources would result.

In the Dubois Badlands Management Unit, exploration and development of locatable minerals on existing claims would be allowed, but the remainder of the unit would be closed. The potential for negative impacts on bighorn sheep, elk and other fish and wildlife resources caused by mineral exploration and development would be precluded, and significant long-term benefits to fish and wildlife resources would result.

The management actions for phosphates would be the same as under Alternative A. No new prospecting permits or leases would be issued. Habitat disturbance would not occur on areas not previously leased and fish and wildlife resources would benefit.

Bighorn sheep and raptors would be the main beneficiaries of withdrawing the lands around Sinks Canyon State Park from mineral leasing.

Conclusion. Adverse impacts could occur to fish and wildlife resources from mineral exploration and development in the Dubois Area, Green Mountain, Beaver Creek, and Gas Hills Management units. Significant long-term benefits would occur to fish and wildlife resources in the remaining management units.

## Environmental Consequences

### Management Actions for Fish and Wildlife

Under Alternative B, management of fish and wildlife would be the same as under Alternative A for all management units except Gas Hills. Existing fish and wildlife habitat improvements would be maintained and routine habitat improvement projects would be completed to enhance and maintain fish and wildlife resources. Special emphasis would be placed on fisheries management in the South Pass and Beaver Creek Management units, elk in the Red Canyon and East Fork Management units, and bighorn sheep in the Whiskey Mountain Management Unit. All of these management actions would provide significant long-term benefits to a variety of fish and wildlife species.

In the Gas Hills Management Unit, the only difference under this alternative is that bighorn sheep would be transplanted into the Sweetwater Rocks. Since this area is historically bighorn sheep range and adequate forage is present to support a large bighorn sheep herd, this transplant would establish another viable herd of bighorn sheep. This action would provide significant long-term benefits to the perpetuation of Rocky Mountain bighorn sheep by reintroducing them to historical range.

Conclusion. Management actions for fish and wildlife would significantly benefit fish and wildlife in all management units. Reintroduction of bighorn sheep into the Sweetwater Rocks would be a significant beneficial impact.

### Management Actions for Forest Management

Under Alternative B, timber harvesting would be accelerated on the Green Mountain Management Unit. The proposed accelerated harvest of approximately 10 MMBF per year, along with the associated road construction, could have an adverse impact on the elk and deer herds by creating excessive loss of thermal and hiding cover. The network of roads needed could greatly increase the traffic on many areas at one time, thereby reducing the safe, isolated areas needed by big game, especially elk.

Forest resources in the Beaver Creek, Gas Hills, and Dubois Badlands Management units are so scarce that no forest management actions are planned and, therefore, no impacts to wildlife are anticipated. Timber sales developed for the

Whiskey Mountain and Dubois Area Management units would incorporate fish and wildlife concerns, resulting in benefits to most fish and wildlife resources.

On the Lander Slope Management Unit, harvesting of one or several larger timber sales could have a long-term beneficial impact on wildlife habitat by creating more diverse vegetation patterns for cover and forage values. This would reduce the long-term adverse impacts to wildlife by harvesting larger volumes in a shorter time and reducing the time period that the area would be subjected to the adverse impacts associated with timber development.

By removing the majority of the volume in a period of 10 to 15 years, the stands would revert again to an even-aged condition, setting the stage for another beetle epidemic and a catastrophic fire situation. A large amount of new forage would be available for a relatively short time; however, as the tree canopy closed, sunlight would not penetrate to the ground and new forage would not be produced. This would be a long-term adverse affect.

By utilizing a modification of this alternative, whereby one or several sales totalling about 10 MMBF, plus sale of other minor forest products on a demand basis, were sold and cut, and restricting activity for about 10 years before another sale, a mixed-age class of timber stands could be developed. This would provide beneficial impacts to the habitat.

The short-term adverse impacts would be present while harvesting was actually taking place; however, with judicious development, utilizing restrictions to minimize impacts, significant long-term habitat improvement could be achieved.

In the South Pass Management Unit there are limited amounts of mature stands to provide adequate cover. Clearcutting these areas would remove much of the cover needed for big game habitat. More forage would be produced in the cutover areas. However, big game populations could be reduced because of the reduction in cover requirements.

Precommercial and commercial thinnings in immature stands would create beneficial impacts. The cover requirements would still be intact after thinning and the forage under the trees would not receive too much shade to retard growth.

Timber harvesting on the East Fork Management Unit would have to be compatible with elk management, which would result in long-term benefits to elk by ensuring that habitat needs



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would be met. The lack of timber harvesting on the Red Canyon Management Unit would not cause any impacts to wildlife.

**Conclusion.** Accelerating timber harvesting on the Green Mountain Management Unit would have an adverse impact on elk and deer. No impacts to wildlife are anticipated from timber harvesting in the Beaver Creek, Gas Hills, Dubois Badlands, Whiskey Mountain, Dubois Area, and East Fork Management units. Harvesting one or several large tracts of timber on the Lander Slope unit could have long-term benefits for wildlife. Clearcutting the remainder of the mature timbered areas on the South Pass unit would have negative impacts on big game.

### Management Actions for Landownership Adjustments

Under Alternative B, no lands would be sold or exchanged in the Green Mountain, Beaver Creek, Gas Hills, Dubois Area, East Fork, Lander Slope, Red Canyon, South Pass, and Dubois Badlands Management units. No impacts to fish and wildlife resources would occur.

In the Whiskey Mountain Management Unit, public lands would be available for sale or exchange after the Bighorn Sheep Interagency Technical Committee has analyzed and recommended landownership adjustments. This would ensure that bighorn sheep are not adversely impacted by any land actions.

### Management Actions for Recreation

Closing the Red Canyon elk winter range to all winter activities would protect the elk from stress and displacement caused by human activities.

### Management Actions for Off-Road Vehicles (ORVs)

Under Alternative B off-road vehicle management actions would have the same effects on fish and wildlife resources as under Alternative A in the Green Mountain, Beaver Creek, Lander Slope, Red Canyon, and South Pass Management units. Limiting ORV use to existing roads and trails would help prevent further terrestrial habitat loss and deterioration of fisheries.

Under Alternative B these effects would also apply to fish and wildlife resources in the Gas Hills, East Fork, Dubois Area, and Whiskey Mountain Management units.

Seasonal closures would apply to the Green Mountain, Red Canyon, Lander Slope, East Fork and part of the Whiskey Mountain Management units. These closures would help reduce the effects of stress and disturbance on wintering big game and the siltation of fisheries during early spring.

Year round closure of the Dubois Badlands would mitigate the adverse effects of ORVs on the fragile fish and wildlife resources in this unit. Vegetation that supplies elk and bighorn sheep populations with essential winter forage would not be destroyed, and erosion would be minimized, reducing the effects of siltation on fisheries.

### Management Actions for Fire

Under Alternative B full suppression with limited or restricted use of heavy equipment would be recommended. As stated under Alternative A, full suppression could have positive or negative impacts on fish and wildlife resources. The limited or restricted use of heavy equipment would protect fragile soils, resulting in significant fish and wildlife benefits.

### Management Actions for Access

Under Alternative B the existing road transportation system would be maintained for all 10 management units, as under Alternative A. In addition, public access would be obtained on several roads.

In the Green Mountain Management Unit, obtaining public access on Willow Creek Road would be beneficial for management of fish and wildlife habitat. Legal access would allow monitoring of impacts from extensive mineral exploration in this area.

In the Beaver Creek Management Unit, obtaining public access on all six roads, which are isolated, would benefit wildlife by allowing easier access for wildlife management activities and by allowing a more uniform and complete harvest of surplus animals.

Public access on the Mormon Basin Road, with seasonal closures on the Lander Slope Management Unit, would allow long-term habitat

## Environmental Consequences

management of the area. However, if the road were upgraded, adverse impacts to wildlife could occur by attracting additional hunters and other uses to the area.

In the Gas Hills Management Unit, obtaining public access on the Copper Mountain Road would benefit wildlife by providing better access for wildlife management and obtaining a better, more even harvest.

In the Dubois Area, public access on the Tappan Creek Road would also benefit wildlife for the same reasons as in the Gas Hills unit. No impacts to fish and wildlife would occur in the remaining management units.

### Management Actions For Wilderness

Alternative B would be wilderness designation for all wilderness study areas. For Sweetwater Canyon, wilderness designation would provide long-term protection of the fishery resources, the moose habitat, the high-priority standard habitat types, and the species associated with these habitats. Restrictions on ORV use, road building and mineral development would benefit wildlife by reducing habitat disturbance and providing a secure area for wintering moose and elk.

For the Sweetwater Rocks, wilderness designation would provide long-term protection of the unique rockland habitat that supports a variety of wildlife species. High-potential habitat for bighorn sheep, peregrine falcons and mule deer habitat would remain undisturbed.

Wilderness designation for the Copper Mountains would provide long-term protection to wildlife habitat, particularly mule deer and antelope crucial winter range.

## Forestry

### Management Actions for Energy and Minerals

#### Oil and Gas, Uranium and Other Locatable Minerals

The Green Mountain Management Unit would be open for leasing, exploration and development under this alternative, and the impacts would be similar to those under Alternative A.

On Green Mountain, the oil and gas and locatable management action of opening the areas to exploration and development could have significant impacts on timber condition, depending on the extent and level of exploration and development. Many exploration drill sites are in timbered areas. If these areas were cleared of timber and regenerated after drilling, the timber condition would generally improve—dead and dying trees would be replaced with young, growing stock. If the drill sites were in areas already regenerated, the impact would be adverse, because the growing stock would be destroyed and the growth on that site lost for the period of time taken for exploration activities.

On Lander Slope and South Pass, these management actions would have an insignificant impact on the forestry resources.

On Green Mountain oil and gas and locatable management actions would have significant impacts on access, depending on the extent of exploration and development activities. If existing roads were used for access to exploration sites, the impact could be beneficial in some cases, because some roads would need to be upgraded, which might reduce the soil erosion from its present level. Also, these roads could create access for the public to harvest dead timber in more areas.

The impact of using existing or new roads could also be adverse, depending on the level of control exerted over the location and construction and maintenance activities.

If many newly constructed roads were needed, this could increase the erosion potential and also, if they were permanent or semi-permanent, 2 to 2.5 acres per mile of road construction would be taken out of the forestry land base.

### Management Actions for Forest Management

#### Timber Quantities

On Green Mountain the larger harvest level advocated (up to 7 MMBF sawtimber and 1.5 to 2 MMBF fuelwood and other products) would have a significant impact on timber quantities by depleting most of the larger timber in about 5 years.

On Lander Slope the high level of harvest would deplete the larger timber in 5 to 7 years, but would replace it with young, healthy stands of regeneration.

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On South Pass, the forestry management actions would have no significant impact on timber quantities.

### Sustained Yield

On Green Mountain increasing the harvest would have a significant effect because it would bring the timber lands under intensive management more quickly and thereby increase the growth of timber stands dramatically. This would eventually lead to a higher, more reliable sustained yield figure.

On Lander Slope the impact of harvesting large timber volumes would replace the dying and dead stands with regeneration and quickly bring the area under intensive management. This would increase the growth rate of stands and eventually produce a higher and more reliable sustained yield harvest figure.

On South Pass the forest management actions would have no significant impact on sustained yield.

### Timber Condition

On Green Mountain this large harvest level would significantly improve the condition of the timber stands by replacing the dead and dying timber with young, growing stock. It would greatly reduce the mistletoe infestation, which deforms the trees, reduces their growth and eventually kills them. The mountain pine beetle would be greatly reduced by removing susceptible trees.

By waiting approximately 20 years to harvest old-growth adjacent to regenerated clearcuts, the mistletoe infestation would not be reduced but would reinfest the new trees, thereby starting the cycle over again.

The use of thinning in younger stands has a significant beneficial impact, because it transfers the growth potential onto fewer, healthier stems and prevents the stands from stagnating at an early age.

The impacts on the forestry resources on Lander Slope and South Pass would be similar to impacts on Green Mountain.

### Timber Demand

On Green Mountain and South Pass, the forest management actions would have no significant impact on demand. On Lander Slope, the demand

would be significantly affected by possibly transferring some of the logging from Green Mountain and Dubois to this area. Also, the demand of many commercial wood cutters and individual public wood cutters could be met in this area.

### Access

On Green Mountain the proposed large harvest could mean less road construction for more volume. This harvest would make more intensive maintenance of the Green Mountain Loop Road necessary to keep it in a useable condition.

The Willow Creek Road would also need maintenance and some relocation. Some easement acquisition along the Willow Creek Road might also be necessary.

On Lander Slope the access to this area would be significantly impacted by offering large timber sales. Some existing roads would need to be upgraded and some new construction would be necessary. Both of these would increase access by the public for various activities. This would generally be beneficial for the forestry program, because it would create access for wood cutters to remove much of the dead and dying timber stands.

On South Pass the forest management actions would have no significant impact on access.

### Logging and Regeneration

On Green Mountain this proposed large harvest level would mean more employment and more revenues for the timber industry. It would also significantly impact timber regeneration by removing large areas of dead and dying timber to create optimum conditions for regeneration.

The use of irregular clearcuts, up to a limit of 25 acres in size, would enhance natural regeneration potential by creating more edge effect and thus larger trees closer to harvested areas to produce seed for regeneration.

Preparation of seedbeds by piling and burning the slash would improve the potential of the natural regeneration. This would enhance the value and economics of sales by achieving natural regeneration instead of planting or directly seeding harvested areas.

By utilizing thinnings in younger stands, regeneration would be enhanced by transferring

## Environmental Consequences

the growth onto fewer well-formed trees and preventing the stagnation of stands as they age.

The forestry management actions would have similar impacts on Lander Slope and South Pass as on Green Mountain.

### Fire

On Green Mountain the harvest level would generally have the same impact as under Alternative A, only it would occur faster.

The impacts of fire management on Lander Slope would be similar to those on Green Mountain. These actions would have no significant impact on fire in the South Pass area.

## Cultural/Natural History Resources

### Management Actions for Energy and Minerals

#### Oil and Gas

This program has standard protective measures (see Chapter II) that should adequately protect many cultural resources. Beyond the standard measures, Alternative B's management actions would cause significant impacts to several important cultural and natural history resources. These impacts would be beneficial for all the affected resources involved. Alternative B would cause beneficial impacts through two forms of oil and gas management actions. No-surface occupancy restrictions would protect nine important cultural and natural history resources through the prevention of oil and gas-related surface disturbances and intrusions. These resources are the Oregon/Mormon Trail corridor (Includes the Gillespie Place/Radium Springs site, the Willies Handcart Commemorative site and part of the Rocky Ridge site) (31,500 acres), the Beaver Rim proposed National Natural Landmark (1,120 acres), the Ice Spring Slough historical site (1,250 acres), the proposed South Pass National Register Mining District (11,900 acres), the Red Canyon National Natural Landmark (5,760 acres), Warm Spring Canyon Flume, Natural Bridge and Geyser site (190 acres), and Martin's Cove (600 acres).

Withdrawals denying the leasing of oil and gas would also protect six important cultural resources through the prevention of oil and gas-related surface disturbances and intrusions. These resources are the Split Rock Landmark (640 acres), part of Rocky Ridge (560 acres), the Aspen Grove Campsite (280 acres), the Castle Gardens Rock Art site (80 acres), the Devil's Gate Landmark (400 acres) and fragile lands along the Oregon/Mormon Trail (320 acres). In addition, the standard protection measures of the oil and gas program would ensure adequate protective of the Sparhawk Cabin. Avoidance of the cabin site and its immediate surroundings by oil and gas operations would be feasible in nearly all cases.

The cumulative impacts of Alternative B's oil and gas management actions would be beneficial. Fifteen important cultural and natural history resource properties (covering 54,600 acres) would be protected from oil and gas-related impacts by either no-surface occupancy or no-leasing restrictions. This situation would result in protection for all of the important affected cultural and natural history resources of the resource area from oil and gas-related impacts.

#### Locatable Minerals

This program has limited standard protective measures (see Chapter II), especially for operations disturbing less than 5 acres. As a result, fewer important cultural or natural history resources would be adequately protected by standard protective measures for locatable minerals operations than by the standard protective measures of most other programs. The management actions in Alternative B would cause significant beneficial effects on several important cultural and natural history resources. Alternative B would cause beneficial impacts through two forms of locatable minerals management actions. Plan of operations requirements would help to protect two important cultural resources through the use of measures designed to locate, evaluate and, if necessary, mitigate impacts to important resources affected by mining operations. Although there is a chance that operations could be allowed to proceed without adequate mitigation of impacts to some important resources, this situation is expected to occur only rarely. Resources that would be covered by plan of operations requirements under this alternative are Sparhawk Cabin (10 acres) and BLM-administered surface lands along the Oregon/Mormon Trail corridor (21,700 acres).



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Withdrawals that close lands to mineral location and activity would also protect 14 important cultural resources through the prevention or reduction of locatable minerals-related surface disturbances and intrusions. These resources are Split Rock Landmark (640 acres), the entire Rocky Ridge site (840 acres), the Aspen Grove campsite (280 acres), Gillespie Place/Radium Springs (40 acres), Willies Handcart Commemorative site (40 acres), Ice Spring Slough site (1,250 acres), Castle Gardens Rock Art site (80 acres), Devil's Gate Landmark (400 acres), fragile lands along the Oregon/Mormon Trail (320 acres), Beaver Rim proposed National Natural Landmark (1,120 acres), Red Canyon National Natural Landmark (5,760 acres), the proposed South Pass National Register Mining District (11,900 acres), Martin's Cove (600 acres), and Warm Spring Canyon (190 acres).

The cumulative impacts of Alternative B's locatable minerals management actions would be beneficial. Sixteen important cultural and natural history resource properties (covering 45,170 acres) would be protected from mining impacts through plan of operations or no-mining restrictions. This situation would result in a high degree of protection for all of the affected resources of the resource area.

### Phosphates

This program has standard protective measures (see Chapter II) that should adequately protect many cultural resources. Beyond the standard measures, Alternative B's management action would cause significant impacts to one important natural history resource. The impacts would be beneficial on this specific resource. The management action would close phosphate prospecting and leasing and would protect the Red Canyon National Natural Landmark (NNL), through the prevention of phosphate mining-related surface disturbances and intrusions. The Red Canyon NNL covers 5,760 acres. No adverse impacts would occur because of the total prevention of phosphate-related activities.

The cumulative impacts of Alternative B's phosphate management action would be beneficial. One important natural history resource property (covering 5,760 acres) would be protected from all phosphate-related activities. This situation would result in the protection of an important affected natural history resource of the resource area from phosphate-related impacts.

### Management Actions for Landownership Adjustments and Utility Systems

This program has standard protective measures (see Chapter II) that should adequately protect many cultural resources. Beyond the standard measures, Alternative B's management actions would cause significant impacts to several important cultural and natural history resources. These management action impacts would be both adverse and beneficial, depending on the resource involved.

#### Adverse Impacts

Alternative B would cause adverse impacts through some of the utility system management actions. Major utility systems allowed on seven cultural and natural history resource properties could adversely impact those sites through modern surface disturbances and intrusions. These endangered resources are the Oregon/Mormon Trail (includes the Gillespie Place/Radium Springs site, and Willies Handcart site) - (31,500 acres), Ice Spring Slough site (1,250 acres), the entire Rocky Ridge site (840 acres), Beaver Rim proposed National Natural Landmark (1,120 acres), and Devil's Gate Landmark (400 acres).

#### Beneficial Impacts

Alternative B would cause beneficial impacts through the closure of major utility systems in some management units. Prevention of major utility systems would benefit two important cultural resources through the continued preservation of their important values. These resource properties are the Red Canyon National Natural Landmark (5,760 acres) and the proposed South Pass National Register Mining District (11,900 acres).

Landownership adjustment management actions involving retention of BLM-administered lands could beneficially impact one important cultural resource property through the retention of certain lands by BLM. Retention of these lands would result in the continued protection of important historical trail resources. These resources are part of the Oregon/Mormon Trail; trail resources on 1,029 acres would be preserved in their present state under this management action.

## Environmental Consequences

Standard procedures used in the utility systems management program would, in some cases, help ensure avoidance or adverse impacts on certain important cultural resources. Because of the situations of these resources, unfavorable topography, unique location, etc., utility systems would probably not be built near these resources; in that sense, a beneficial effect would occur. The resources likely to be avoided are Sparhawk Cabin (10 acres), Split Rock Landmark (640 acres), the Aspen Grove Campsite (280 acres), Castle Gardens (80 acres), the Warm Spring Canyon Flume, Natural Bridge, and Geyser (190 acres), and Martin's Cove (600 acres).

The cumulative impacts of Alternative B's landownership adjustments and utility systems management actions could generally be adverse. Seven important cultural and natural history resource properties (covering 35,110 acres) could be subject to impacts from utility systems. Two important cultural resource properties (covering 17,660 acres) would be protected from utility system impacts. Six other important resources (covering 1,800 acres) would probably not be impacted by utility systems, primarily because of their locations. Elements of one important resource would be retained by BLM and would be protected. This situation would result in continued vulnerability for a majority of the important affected resources of the resource area, although several important resources would be protected.

### Management Actions for Cultural/Natural History

This program is oriented toward cultural and natural history resource protection, and all special management actions under this program would enhance the protection of selected important cultural and natural history resources. Alternative B would cause beneficial impacts through several special management actions. Management plans would help protect several cultural resource properties through the well thought out

management of those resources. The resources would be the Castle Gardens Rock Art site, Warm Spring Canyon, the Oregon/Mormon Trail corridor (including the trail-related sites of the Split Rock Landmark, Ice Spring Slough, Rocky Ridge, Gillespie Place/Radium Springs, Willies Handcart Commemorative site, Devil's Gate Landmark, Martin's Cove, and Burnt Ranch (if acquired)), Beaver Rim proposed National Natural Landmark, Red Canyon National Natural Landmark, and the South Pass proposed National Register Mining District (all important sites).

Other important cultural and natural history resources would not be given special management but neither would they be adversely affected. Because of each property's integrity and protected location, these resources would not suffer from a lack of special cultural/natural history program management at this time. These properties are the Sparhawk Cabin and the Aspen Grove site.

The cumulative impacts of Alternative B's cultural/natural history management actions would be beneficial. Fourteen important cultural properties would be protected through enhanced management, and two more resources would remain protected despite the lack of enhanced management.

Conclusion. Alternative B would impact the affected cultural and natural history resources of the resource area in beneficial ways, and would be the most beneficial choice of all the alternatives from a cultural/natural history resource protection viewpoint. Alternative B protects more important resources than alternatives A and C in the Oil and Gas, Locatable Minerals, and Landownership programs. The most important resource (the Oregon/Mormon Trail and its sites) in the resource area would be most beneficially impacted by the Oil and Gas, the Locatable, and Landownership management actions under this Alternative. The South Pass Mining District, the second most important cultural resource in the resource area, would also be the most beneficially impacted by the Oil and Gas, Locatable, Landownership, and Cultural/Natural History management actions of this alternative (see table 4-7).

**TABLE 4-7**  
**EFFECTS ON SIGNIFICANT CULTURAL/  
 NATURAL HISTORY RESOURCES**  
**ALTERNATIVE B**

Management Unit	Significant Resources	Management Actions	Resource Protected
Green Mountain	Sparhawk Cabin	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes (1) Yes  Yes (1) Yes (2)
Beaver Creek	Oregon/Mormon Trail	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No  No Yes (4)
	Oregon/Mormon Trail Sites —		
Beaver Creek	Split Rock Landmark	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes  Yes (1) Yes (4)
Beaver Creek	Ice Springs Slough	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes  No Yes (4)
Beaver Creek	Rocky Ridge	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes  Yes (1) Yes (4)
Beaver Creek	Gillespie Place/ Radium Springs	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No  No Yes (4)
Beaver Creek	Willies Handcart Site	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes  No Yes (4)
Beaver Creek	Beaver Rim Proposed NNL	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes  No Yes
Beaver Creek	Burnt Ranch	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	N/A N/A  N/A Yes (4)
Beaver Creek	(See Wilderness Supplement for site description)	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes  Yes (1) Yes (2)



**TABLE 4-7 (Continued)**  
**EFFECTS ON SIGNIFICANT CULTURAL/  
 NATURAL HISTORY RESOURCES  
 ALTERNATIVE B**

Management Unit	Significant Resources	Management Actions	Resource Protected
Red Canyon	Red Canyon NNL	Oil and Gas	Yes
		Locatable Minerals	Yes
		Phosphates	Yes
		Landownership Adjustments and Utility Systems	Yes
		Cultural/Natural History	Yes
South Pass	South Pass Proposed National Register Mining District	Oil and Gas	Yes
		Locatable Minerals	Yes
		Landownership Adjustments and Utility Systems	Yes
		Cultural/Natural History	Yes
Gas Hills	Castle Gardens	Oil and Gas	Yes
		Locatable Minerals	Yes
		Landownership Adjustments and Utility Systems	Yes (1)
		Cultural/Natural History	Yes
Gas Hills	Oregon/Mormon Trail	Oil and Gas	Yes
		Locatable Minerals	Yes
		Landownership Adjustments and Utility Systems	No
		Cultural/Natural History	Yes (4)
Gas Hills	Oregon/Mormon Trail Sites - Devils Gate Landmark	Oil and Gas	Yes
		Locatable Minerals	Yes
		Landownership Adjustments and Utility Systems	No
		Cultural/Natural History	Yes (4)
Gas Hills	Martins Cove	Oil and Gas	No
		Locatable Minerals	No
		Landownership Adjustments and Utility Systems	Yes (1)
		Cultural/Natural History	Yes (4)
Dubois Area	Warm Spring Canyon Flume, Natural Bridge and Geyser	Oil and Gas	Yes
		Locatable Minerals	Yes
		Landownership Adjustments and Utility Systems	No
		Cultural/Natural History	Yes

(1) - Resource would be protected by standard protection measures.

(2) - Resource would not have special cultural/natural history program management, but would still be adequately managed.

(3) - Part of site would be protected, part would not be protected.

(4) - Managed according to the Oregon/Mormon Trail Management Plan recommendations.

### ALTERNATIVE C

#### Management Actions for Energy and Minerals

Alternative C would maximize the acreage open to oil and gas leasing and would decrease the acreage under seasonal and no-surface occupancy restrictions. As the rating for the potential occurrence of oil and gas increases from low to moderate to high, the restrictions on oil and gas exploration and development would decrease to only those necessary to protect threatened and endangered plant and animal species or nationally significant cultural resources in areas of high potential for oil and gas occurrence. Thus, the adverse impacts of not being able to discover oil and gas reservoirs in no-surface occupancy areas, plus the untimely and inefficient development of subsurface resources, as a result of directional drilling, would be minimized in high-potential areas. However, moderate- and low-potential areas might be precluded by surface restrictions from the discovery of valuable oil and gas resources, and thus the opportunity to be elevated to a higher potential rating category. Alternative C would also maximize the acreage of public land open to locatable mineral entry. However, it would hinder or preclude exploration and development of leasable and locatable minerals by considering disposal of tracts of land.

#### Oil and Gas

Alternative C would maximize the acreage open to oil and gas leasing and would decrease the acreage under seasonal and no-surface occupancy restrictions. The adverse impacts of surface restrictions would vary, depending on the potential for occurrence of oil and gas.

KGSs and Areas with High Potential for Occurrence of Oil and Gas: Management actions for these areas would ensure timely and efficient exploration and development of land known to be valuable for oil and gas resources. Exceptions would be lands that would require restricted or limited use because of threatened and endangered species or nationally significant cultural and natural history sites. Drainage of federal oil and gas reserves by wells drilled on adjacent private and state land would be avoided.

Areas with Moderate Potential for the Occurrence of Oil and Gas: By applying seasonal and

no-surface occupancy restrictions on a case-by-case basis rather than automatically, the adverse impacts of not being able to discover oil and gas reservoirs, plus the untimely and inefficient development of subsurface resources as a result of directional drilling, would be minimized.

Areas with Low Potential for Occurrence of Oil and Gas: The application of seasonal and no-surface occupancy restrictions would result in the same adverse impacts described under Alternative A. No-surface occupancy restrictions would preclude surface disturbing geophysical exploration and thus oil and gas reservoirs might not be discovered. These restrictions would also mandate directional drilling, resulting in untimely and inefficient development of subsurface resources. Seasonal restrictions would also preclude timely development of oil and gas (see Impact to Oil and Gas that are Common to all Alternatives).

Table 4-1 shows the acreage under seasonal, no-surface occupancy, and no-lease restrictions, plus the acreage within each oil and gas potential occurrence category for each management unit. Area-wide no-surface occupancy restrictions would cover approximately 79,000 acres, or 3 percent of the resource area.

Management actions that would consider disposal of tracts of land in the Green Mountain, Beaver Creek, Lander Slope, Red Canyon, Gas Hills, East Fork, Dubois Badlands, and Dubois Area Management units would adversely impact the recovery of known oil and gas resources by hindering exploration and development. Even if the mineral estate were reserved to the United States, negotiations between surface owners and mineral operators could cause time delays and increased cost through compensation for surface damages.

#### Locatable Minerals

Under Alternative C, approximately 99 percent of the public land in the 10 management units would be open to prospecting, exploration and development of locatable minerals. The management actions for locatable minerals would be beneficial because lands that would be closed under alternatives A and B would be open to development under Alternative C.

Management actions would require a plan of operations for exploration and development of approximately 0.5 percent of the acreage open to locatable mineral entry. This restriction could

## Environmental Consequences

cause delays in the development of the mineral resource and could deny use of the most efficient exploration and mining methods.

Management actions for off-road vehicles would not adversely impact locatable minerals under Alternative C to the extent they would under Alternative B, but would create greater impacts than under Alternative A. Actions that limit off-road vehicle use to certain areas or seasons would cause time delays, while claimants and prospectors wait for approval to use off-road vehicles.

Management actions that would consider disposal of tracts of land in the Green Mountain, Beaver Creek, Lander Slope, Gas Hills, and Dubois Area Management units would adversely impact known locatable mineral resources by hindering exploration and development. Even if the mineral estate were reserved to the United States, negotiations between surface owners and mineral operators could cause delays and increased cost through compensation for surface damages.

### Phosphates

The management actions for phosphates under Alternative C would benefit the phosphate resource by allowing leasing, exploration and development of low-grade phosphate resources.

Management actions that would consider disposal of tracts of land in the Beaver Creek, Lander Slope and Red Canyon Management units would adversely impact known phosphate resources by hindering exploration and development. Even if the mineral estate were reserved to the United States, negotiations between surface owners and mineral operators could cause delays and increased cost through compensation for surface damages.

### Other Actions

Under Alternative C, lands around Sinks Canyon State Park would not be withdrawn from mineral entry. Thus, mineral resources around the park would benefit because they would be available for exploration and development.

A detailed description of the segregated and withdrawn areas, plus the areas that would have seasonal and no-occupancy restrictions for each energy and mineral resource can be found in Chapter II, Alternatives Including the Proposed Action.

No other management actions under Alternative C would significantly impact energy and mineral resources.

**Conclusion.** Four management units (the Green Mountain, Beaver Creek, Gas Hill, and Dubois Area units), or 18 percent of the public land within the Lander Resource Area, contain known geologic structures and areas known to have high potential for the occurrence of oil and gas. Since these areas are known to contain valuable oil and gas reserves, they would be available for exploration and development with minimal restrictions, thus ensuring long-term (greater than 10 years) productivity of the oil and gas resource. As the potential for the occurrence of oil and gas decreased to moderate and low, the area covered by surface restrictions would increase to where areas with the least oil and gas value would have the most surface restrictions applied to them. The main drawback of this management action would be that some moderate- and low-potential areas might not have the opportunity to be elevated to a higher potential rating category because the discovery of new oil and gas reservoirs might be precluded. Although this would limit the short-term (0 to 10 years) productivity of the oil and gas resource, it would not necessarily mean the effects would be irreversible, or irretrievable because surface restrictions could be modified or eliminated.

The land available to locatable mineral operations under this alternative would be maximized. However, exploration and development of leaseable and locatable minerals might be hindered or precluded by the disposal of some tracts of land. If the mineral estate was reserved to the United States and made available for disposal under terms of the surface patent, disposal of public land would not create an irreversible or irretrievable effect to locatable minerals.

## Soils, Water and Air Quality

### Management Actions for Energy and Minerals

#### Oil and Gas

In Alternative C the potential for significant impacts to soil, watershed and air quality from oil and gas activities would be the greatest of all alternatives. The most significant impacts would

## Environmental Consequences

occur on those portions of each management unit considered to be within an area of known geologic structures (KGSs). All or part of all management units would potentially be open to oil and gas exploration and development with this alternative.

Impacts would be the same as described in alternatives A and B for oil and gas exploration, development and reclamation, except they would be greater in extent and significance. As in alternatives A and B, the major exploration activity of oil and gas development is seismographic investigations. Impacts associated with seismographic investigations are: vegetative cover destruction, soil compaction, gully and rill erosion, and streambank disturbance. All of these impacts would result in accelerated erosion and potentially increased levels of sediment into adjacent streams.

The most significant impacts to soil, watershed and air quality would occur during development of oil and gas resources. Impacts would be similar to those that occur with seismographic activities; however, impacts would generally be concentrated on individual well locations, which average approximately 10 acres in size. An additional problem encountered with site development would be salt loading. This is not common but becomes a significant problem when previously nonsaline soils become saline from drastic soil disturbance on oil and gas development sites that restricts drainage or lowers the water table. Salt loading might limit reclamation success by restricting the growth of native species on reclaimed sites.

Most reclamation efforts would be directed at reducing accelerated soil erosion rates and establishing native vegetation on disturbed sites. In the short-term it takes an average of 3 to 5 years to establish adequate vegetation to control accelerated erosion on disturbed sites. In the long-term, it takes a substantially longer period of time to establish permanent native vegetation and to increase site fertility. On most disturbed sites, soil characteristics (soil physical, chemical and biological properties) may not return to their pre-disturbance levels within our lifetimes. This is an irreversible and irretrievable impact.

Air quality in producing areas could be adversely impacted by vehicle emissions, dust and potentially dangerous gases emitted from producing wells. These impacts might be significant in the short-term (during well development and production phases, in a localized area), and insignificant in the long-term (following well closure).

### Locatable Minerals

Under Alternative C, the most significant impacts to soil and watershed resources from locatable mineral exploration and development could occur. Most impacts would be similar to those described in Alternative A; however, the extent and significance of disturbance on the East Fork and Dubois Badlands would be greater than in Alternative A. As in Alternative A, all units would be partially or completely open to exploration and development of locatable minerals. With exploration and development of locatable minerals, disturbed lands would be subject to soil compaction and accelerated wind and water erosion. Water quality related values would be affected by increased sediment loads in disturbed watersheds. Air quality values would have the potential to be degraded, depending on the amount of activity from locatable mineral exploration and development.

Under this alternative, a significant increase in soil compaction and erosion could occur on the Dubois Badlands Management Unit, compared to Alternative A, with the removal of seasonal restrictions to protect watershed values.

### Phosphates

Under Alternative C impacts from phosphate development would be significantly greater than in other alternatives, because of the availability of the Lander Slope and Red Canyon Management units for new phosphate prospecting, leasing and development. Impacts from phosphate development would be similar to those described under the locatable minerals section, except for an increase in extent and significance of those impacts.

### Management Actions for Fish and Wildlife

Management actions for fish and wildlife for this alternative would create a significant increase in short-term impacts to soil, watershed and air quality on the Lander Slope, Green Mountain and Red Canyon Management units. In the short-term, prescribed burning on these management units would potentially increase wind and water erosion, sedimentation and degrade local air quality. In the long term, impacts would become insignificant as vegetation was reestablished. Impacts on all other management units would be the same as they would be in Alternative A.

## Environmental Consequences

### Management Actions for Forestry

Overall, impacts from timber harvesting would be the most significant under this alternative. Although slight reductions in impacts would occur on the Green Mountain and South Pass Management units, significant increases would occur on the Lander Slope Management Unit. Impacts on all other management units would remain the same as in the other alternatives.

In all units, in the short-term, timber harvest would vary in extent and significance, but would increase erosion and resultant sedimentation from forest cover removal and from road disturbance associated with logging operations. In the short term, soil compaction would increase the potential for surface runoff, accelerated erosion and increased sedimentation in roadways, landings and skid trails from heavy equipment use. In the long term, site productivity would be significantly reduced in compacted areas.

If slash piles were burned after timber harvesting, soil nutrient enrichment and scarification for seedbed preparation would cause beneficial impacts on these areas.

### Management Actions for Access

In silty and fine sandy loam soil textures, air quality might be degraded during road construction and heavy local traffic use. These impacts would be insignificant and restricted to areas of local disturbance.

### Management Actions for Landownership Adjustments and Utility Systems

No significant impacts to soil, watershed or air quality would be expected with the landownership adjustments recommended in this alternative.

On the Green Mountain, Beaver Creek, Lander Slope, Gas Hills, and Dubois Area Management units, impacts from installation of utility systems would be the same in this alternative as alternatives A and B.

On the Red Canyon and Dubois Badlands Management units, impacts would be the same as they are in Alternative B and significantly more than they are in Alternative A.

There would be significantly less impact on the Whiskey Mountain Management Unit from installation of utility systems in this alternative than in alternatives A and B.

On the South Pass Management Unit, impacts from utility systems would be the same as in Alternative B and significantly less than in Alternative A.

### Management Actions for Off-Road Vehicles (ORVs)

Overall, impacts from ORV use would be similar to those in Alternative A and slightly greater than in Alternative B. The major increase in impacts, compared to Alternative B, would be on the Dubois Badlands, which would have only seasonal restrictions on ORV use. As in alternatives A and B, major impacts from ORV use to soils, watershed and air quality would occur during the season of use and for those periods when the soil was not frozen or snow covered. The major impacts would be soil compaction and accelerated wind and water erosion, which would depend on the amount of traffic and how the road had been engineered and maintained.

### Management Actions for Fire

Limited fire suppression would be used in all management units, therefore, impacts to soil and watershed resources would be less from fire suppression operations in this alternative than in alternatives A and B. Impacts such as soil compaction, wind and water erosion, reduced site productivity, and sedimentation would be less significant under this alternative.

Limited fire suppression might result in some impacts to soils, watershed and air quality. Generally, where a management decision has been made to allow wild fires to burn, two significant impacts might occur. One would be to increase the potential for soil erosion until vegetation has been reestablished, and the other would be to cause a significant reduction in site productivity on some areas damaged by intense wild fire, e.g., high soil loss. These impacts would be significant in the short term or long term, depending on extent and location of the impacts. In addition, local air quality would be degraded during wildfire events, a short-term impact.

Prescribed burns could adversely affect water quality, accelerate soil erosion, and degrade air quality. In properly planned prescribed fires, these effects could be minimal and held to acceptable levels. As vegetation increased after a prescribed fire, accelerated erosion rates would decrease and water quality would increase.



## Environmental Consequences

Overall, impacts from fire suppression operations would be the least significant, and impacts from wildfire damage would be the most significant under this alternative.

### Fish and Wildlife

#### Management Actions for Energy and Minerals

##### Oil and Gas

Under Alternative C management actions for all management units would be the same but would vary for different areas within each unit, depending on the potential for the occurrence of oil and gas. Management actions would be applied differently to three major categories:

1. KGSs and high potential oil and gas areas
2. Moderate potential oil and gas areas, and
3. Low potential oil and gas areas.

In the Green Mountain, Beaver Creek, Gas Hills and Dubois Area Management units discontinuing the use of no-surface occupancy stipulations in high-potential oil and gas areas and KGSs would adversely impact big game habitat, fisheries, waterfowl, beaver, and a variety of other wildlife species associated with open water and riparian areas. These adverse impacts could be significant, long term and result in an irretrievable and irreversible commitment of resource, depending on the extent of oil and gas development.

Loss of the protection afforded big game animals, sage grouse nesting areas and raptor nest sites in high-potential oil and gas areas by eliminating seasonal restrictions would subject these animals to additional population depressing factors.

A major adverse impact would occur to the Green Mountain elk herd if the no-surface occupancy restriction were eliminated on the elk crucial winter range. Heavy habitat losses would significantly reduce elk carrying capacity and population levels.

The Lander Slope, Red Canyon, South Pass, East Fork, Dubois Badlands, and Whiskey Mountain Management units have low- or moderate-potential for oil and gas. Impacts to wildlife would be the same as leasing with no-surface occupancy and seasonal stipulations in these areas, unless an oil and gas reserve were discovered that would elevate the potential to high.

In moderate-potential areas, adequate documentation of the need for stipulations to avoid significant impacts to wildlife is already available. Requiring all stipulations to be considered on a site-by-site basis would only extend delays in lease and permit processing, and on-site investigations would be conducted to confirm or refine wildlife inventory data.

Conclusion. Green Mountain, Beaver Creek, Gas Hills, and Dubois Area Management units could suffer significant adverse impacts to big game, fisheries, waterfowl, beaver, and other wildlife species. Impacts to other management units would be the same as leasing with no-surface occupancy and seasonal stipulations.

##### Locatable Minerals

Under Alternative C the Green Mountain, Beaver Creek, Lander Slope, Red Canyon, and Gas Hills Management units would be managed the same as under Alternative A. The units would be entirely open for exploration and development of locatable minerals, except within areas previously withdrawn from mineral entry. Briefly summarized, significant long-term impacts could occur to elk and trout in the Green Mountain Management Unit; sage grouse, mule deer and trout in the Beaver Creek Management Unit; elk, moose, bighorn sheep, mule deer, and trout in the Lander Slope and Red Canyon Management units; and mule deer, antelope, sage grouse, and raptors in the Gas Hills Management Unit.

The South Pass, East Fork, Dubois Badlands, Whiskey Mountain, and Dubois Area Management units would be open to exploration and development of locatable minerals.

In the South Pass unit, trout, moose, beaver, and many other wildlife species would suffer significant long-term impacts. Many high-value standard habitat types would be severely degraded.

Mineral exploration and development in the East Fork, Dubois Badlands, Whiskey Mountain, and Dubois Area Management units could cause significant long-term impacts to elk, moose, bighorn sheep, mule deer, antelope, trout, and many other fish and wildlife resources. Many of these impacts would result in an irreversible and irretrievable commitment of resources.

##### Phosphates

Opening the Lander Slope, Beaver Creek, and Red Canyon Management units to phosphate

## Environmental Consequences

prospecting, leasing and development could potentially degrade the high-value fish and wildlife resources.

If lands around Sinks Canyon were not withdrawn from mineral entry, significant long-term impacts could occur to bighorn sheep and raptors.

**Conclusion.** Significant long-term adverse impacts could occur to high-value fish and wildlife resources in all management units under this alternative. In some units, such as Whiskey Mountain and East Fork, an irreversible and irretrievable commitment of fish and wildlife resources would result.

### Management Actions for Fish and Wildlife

Under Alternative C management actions for fish and wildlife would be the same as for Alternative A, with additional emphasis on prescribed burning to improve habitat in the Green Mountain, Lander Slope, Red Canyon, and South Pass Management units.

Burning dense and decadent stands of big sagebrush and mountain shrub habitat would increase forage for wintering elk, mule deer, moose, and bighorn sheep. Burning decadent aspen and willow in the Red Canyon and South Pass units would benefit moose, elk, fish, and a variety of other wildlife species dependent on healthy aspen and willow stands.

**Conclusion.** Under Alternative C management actions for fish and wildlife would benefit many species in all management units. Emphasizing prescribed fire in four units would provide significant long-term benefits to big game and many other fish and wildlife species as well.

### Management Actions for Forestry

Under Alternative C, for the Green Mountain Management Unit, the harvest of approximately 4 MMBF per year on a compartment basis would have a beneficial long-term effect on elk and deer herds by concentrating most activities in specified areas for certain time intervals. This would create forage areas, while maintaining some isolated areas for temporary relocation of animals.

This management regime, if followed diligently, would create a more organized pattern of activities than has been undertaken in the past. This could

have far reaching beneficial impacts on other species such as birds and small mammals by allowing them use of much of the timbered area in a relatively undisturbed state, while forest management activities were being conducted in one or more isolated areas.

Forest resources in the Beaver Creek, Gas Hills and Dubois Badlands Management units are so scarce that no impacts to wildlife would be anticipated. Timber sales planned for the Whiskey Mountain, Dubois Area and East Fork Management units would incorporate fish and wildlife objectives and needs, which would result in benefits to most fish and wildlife resources.

This alternative would mean a more or less permanent presence of logging and firewood cutting activity on the Lander Slope Management Unit. This would have an adverse impact on the wildlife and habitat, causing a decline in populations through harassment and relocation, removal of large areas of thermal and hiding cover, surface disturbance on forage vegetation areas, and increased human and machine activity.

This alternative would have a more beneficial impact on the habitat diversity than Alternative A by producing stands with more diversity in age classes and more available forage for a longer period. Increased use of wildlife resources by the public through increased access and consequent increased fuelwood harvest will be achieved. However, this continual activity would be an adverse impact because it would create continual harassment of animals and consequent displacement of the herds.

The management of the aspen stands would be a beneficial impact on the habitat diversity. Much of the present aspen is mature or overmature and is in need of rejuvenation.

For the Red Canyon Management Unit, an intensity of timber harvest similar to Alternative A, with restrictions, would be recommended. If the proposed restrictions were utilized in the harvesting and prescribed burning of pine and aspen stands, impacts to wildlife and wildlife habitat would be beneficial.

Some timber stands would be opened and more complex forage vegetative communities could be produced in these areas.

On the South Pass Management Unit, small volumes of coniferous timber would be harvested, while 600 to 700 acres of aspen would be managed to improve moose habitat. These actions would increase vegetative diversity and promote aspen regeneration, resulting in beneficial impacts to fish and wildlife resources.



## Environmental Consequences

Conclusion. Long-term benefits for elk and deer herds would occur for the Green Mountain Management Unit. Adverse impacts would result from accelerated harvest on the Lander Slope unit, but habitat diversity and forage production would increase. Impacts to fish and wildlife resources would be beneficial on the Red Canyon and South Pass Management units. Wildlife needs would be considered on the remaining management units in any timber sales, which would result in beneficial impacts.

### Management Actions for Landownership Adjustments and Utility Systems

Under Alternative C the disposal of two isolated tracts in the Green Mountain Management Unit would not cause any significant impacts to fish and wildlife resources.

In the Beaver Creek Management Unit, 41 tracts would be targeted for disposal. The majority of these tracts are scattered throughout the area. Only about one-fourth of the tracts has legal access, and most of the tracts are small. The tracts do not represent unique types of wildlife habitat and none of the tracts is known to contain sources of water, except for 164, which has a spring on it. There appears little chance that there would be a change in land use if the lands were disposed of, because of lack of demand for homesites in the area and problems in acquiring access. The adjoining landowners would have priority, if the lands were sold, which could result in the lands being purchased by ranchers and continuing to be used for livestock grazing. For these reasons, there would probably be no change in land use if the lands were disposed of.

There are four tracts (125, 129, 130, and 131) in the area that contain a high diversity of species habitat, including waterfowl habitat. These parcels are near the Sweetwater River bottom and the associated riparian areas. There is some potential for homesites or intensive agricultural development in these areas that could be detrimental to the high-value fish and wildlife habitat.

In the Gas Hills Management Unit, 60 tracts would be considered for disposal. These tracts are concentrated in Copper Mountain and scattered throughout the rest of the unit. The tracts in the Copper Mountain area are isolated from other public land in the area. These parcels provide crucial and high-value habitat for elk, deer and upland game, but because of the rugged terrain and lack of access, the land use would probably not change if the tracts were disposed of.

The remaining tracts scattered throughout the unit provide habitat for antelope, deer and sage grouse. Because of the remoteness and semi-arid qualities of the land and lack of demand for these types of lands, no changes in land use would be anticipated; therefore, there should be minimal impacts to fish and wildlife resources.

In the Dubois Badlands Management Unit, three isolated tracts would be considered for disposal. Existing land use would probably not change because of the lack of access, lack of demand and adjacent landowner preference for purchase. No impacts to fish and wildlife resources would occur from disposal of these tracts.

In the Dubois Area Management Unit, 31 tracts would be considered for disposal. All of these tracts have high fish and wildlife values, but only 13 tracts have physical or legal access. Of these 13 tracts, four parcels are adjacent to the Wind River or east fork of the Wind River. These tracts have high riparian and fishery values. Because of access on these 13 parcels, land use could change, resulting in significant adverse impacts to fish and wildlife resources. Because there is no access, terrains are steep and the parcels are remote, no impacts are anticipated with disposal of the remaining 18 tracts.

Twenty-six parcels would be considered for disposal in the Lander Slope Management Unit. No land change would be anticipated on 16 tracts, but the remaining 10 tracts have legal or physical public access or have a potential to be developed as homesites. These tracts, where the land use could change, could cause significant long-term adverse impacts to high-value wildlife resources. These impacts would be irreversible and irretrievable.

The tracts that would be the target for disposal in the Whiskey Mountain and East Fork Management units would cause detrimental impacts to high-value wildlife, unless these parcels were transferred to the U.S. Fish and Wildlife Service, U.S. Forest Service or Wyoming Game and Fish Department. Since no lands would be disposed of in the Red Canyon and South Pass Management units, no impacts would occur to fish and wildlife.

### Management Actions for Recreation

Under Alternative C wintering elk could be significantly impacted by winter recreational activities in the Red Canyon Management Unit.

### Management Actions for Off-Road Vehicles (ORVs)

In the long term, off-road vehicle management actions under Alternative C would have the same effects on fish and wildlife resources as under Alternative A in the Green Mountain, Beaver Creek, Red Canyon, and South Pass Management units. In these management units, ORV use would be limited to existing roads and trails, which would help prevent further terrestrial habitat loss and further deterioration of fisheries. In the Green Mountain, Lander Slope and Dubois Badlands Management units, seasonal closures would help reduce stress and disturbance of wintering big game populations.

Off-road vehicle management actions under Alternative C would adversely affect fish and wildlife resources for the long term in the Lander Slope, East Fork, Whiskey Mountain, Dubois Badlands, and Dubois Area Management units. Habitat availability would decrease and the quality of some fisheries would decline as new roads and trails increased in these areas. The lack of winter closures in the Lander Slope and East Fork Management units might result in displacement of big game animals onto private lands, causing conflicts with landowners.

Although ORV traffic would be limited to existing roads and trails in the Dubois Badlands, the fragility of the area, combined with the difficulty of enforcement, would result in fish and wildlife habitat damage if ORVs deviated from existing roads and trails. Habitat damage and ORV disturbance would adversely affect big game populations, in spite of the winter closure for this unit.

### Management Actions for Fire

Under this alternative limited suppression and prescribed fires could improve forage on elk, moose, mule deer, and bighorn sheep seasonal ranges, as well as to improve grouse habitat. Under planned conditions, natural fires could improve wildlife habitat if allowed to burn. Conditions and restrictions on fire management techniques and equipment could be planned to prevent unnecessary damage to fish and wildlife habitat.

### Management Actions for Access

Under Alternative C the existing transportation system would be maintained in all 10 management units, as described under Alternative A. Wildlife impacts would be beneficial on the Lander Slope Management Unit and no impacts would occur in the remaining nine units.

### Forestry

#### Management Actions for Energy and Minerals

##### Oil and Gas, Uranium and Other Locatable Minerals

Under this alternative, the entire Green Mountain Management Unit would be open for leasing, exploration and development for oil and gas, uranium and other locatable minerals under certain guidelines.

On Green Mountain oil and gas and locatable minerals could have significant impacts on the forestry program, depending on the level of future exploration and development. These activities could significantly reduce the amount of timber available for harvest by depleting the resources in areas not planned for harvest in the immediate future. This could be beneficial in some areas by removing nonsalable quality timber and replacing it with regeneration after rehabilitation. In other areas it could create adverse impacts by removing healthy, growing stands and losing a long period of growth on these sites. It could also be a long-term, adverse impact if sites were permanently taken out of timber production by oil and gas or locatable mineral production.

On Lander Slope the oil and gas and locatable minerals management actions would have no significant impact on the forest resources.

On South Pass the oil and gas and locatable actions would have no significant impact on timber quantities.

## Environmental Consequences

### Management Actions for Forestry

#### Timber Quantities

On Green Mountain, the forestry action of harvesting at the level of up to 3 MMBF of sawtimber and 1.5 to 2 MMBF of fuelwood and other products per year would deplete the larger timber within 10 to 15 years.

On Lander Slope the action of harvesting about 1 MMBF of timber per year, plus the public demand for firewood, would deplete the larger timber within 20 years.

On South Pass the harvest level would have the same impact as Alternative B, except the aspen stands would be managed more intensively. This would reduce the level of larger trees and increase the regeneration in aspen stands.

#### Sustained Yield

On Green Mountain, managing the timber on a compartment basis, using a harvest level roughly equal to the present demand, would bring the area under a more organized, systematic, intensive management regime. This would produce optimum growth conditions to take advantage of the productive potential of the land and eventually produce a reliable sustained yield figure.

On Lander Slope the impacts from the forest management actions would be the same as under Alternative B.

On South Pass there would be no impact on sustained yield from forest management actions.

On Green Mountain oil and gas and locatable mineral management actions could have a significant effect on the sustained yield figures by removing timber lands from the base acreage, if large deposits were found. By reducing the acreage in the timber land base, the sustained yield figure would be reduced.

#### Timber Condition

On Green Mountain, by harvesting at the proposed level on a compartment basis, the harvesting could be staggered over various sections of the mountain. This would produce a mosaic of different age classes of regeneration over the whole mountain. In this way no large areas of similar age class trees would be adjacent to each other. This would greatly reduce the possibility of another large scale beetle epidemic in the future.

On Lander Slope the forest management action impacts affecting timber condition are the same as under Alternative B.

On South Pass the management action would have the same effect on condition as Alternative B, except the condition of the aspen stands would improve.

On Green Mountain the oil and gas and locatable mineral actions would have the same impact on timber condition as in Alternative B.

#### Timber Demand

On Green Mountain the forest management actions would have no significant impacts on demand.

On Lander Slope the impact on demand from forest management actions would be the same as under Alternative B.

On South Pass the harvest level would have the same impact on demand as Alternative B, with the exception that if the aspen stands were managed intensively, more of the present demand for minor forest products might be met.

#### Access

On Green Mountain the management action of harvesting on a compartment basis might reduce the total length of roads needed for timber sales. This would reduce the physical impact on soil and other resources on the area.

On Lander Slope the impact on access from forest management actions would be the same as under Alternative B.

On South Pass the forest management actions would have no significant impact on access.

#### Logging and Regeneration

On Green Mountain the forest management actions would have the same impacts on logging and regeneration as Alternative A.

On Lander Slope the forest management actions would have the same impacts as Alternative B.

On South Pass the forest management actions of harvesting and thinning would have the same impacts on logging and regeneration as Alternative B, with the exception that by managing the aspen stands intensively, more and healthier regeneration would be produced.

### Management Actions for Fire

Under this alternative, the management action for fire would be limited suppression.

Depending on the specific actions in a plan and the location of fires and weather conditions, limited suppression could have a beneficial impact on the lodgepole pine and aspen stands by replacing the dead and dying stands with young, healthy regeneration, which would take advantage of the growth potential of the site.

This same alternative could have an adverse impact on the Douglas fir stands by killing the presently healthy, growing trees and producing no regeneration on the sites.

### Cultural/Natural History

#### Management Actions for Energy and Minerals

##### Oil and Gas

This program has standard protective measures (see Chapter II) that should adequately protect many cultural resources. Beyond the standard measures, Alternative C's management actions would cause significant impacts to several important cultural and natural history resources. These impacts would be both adverse and beneficial, depending on the type of management action and the resource involved.

**Beneficial Impacts.** Alternative C would cause beneficial impacts through two forms of oil and gas management actions. No-surface occupancy restrictions would protect 33 important cultural and natural history resources through the prevention of oil and gas-related surface disturbances and intrusions. These resources are the Oregon/Mormon Trail corridor (includes the Gillespie Place/Radium Springs site and the Willies Handcart Commemorative site - 26,950 acres), the Beaver Rim proposed National Natural Landmark (1,120 acres), the Ice Spring Slough historical site (1,250 acres), 20 historical sites within the South Pass Management Unit (665 acres), the entire Rocky Ridge Historical site (840 acres), the Warm Spring Canyon Flume, Natural Bridge and Geyser site (190 acres), the Aspen Grove Campsite (280 acres), the Split Rock Landmark (640 acres), the Red Canyon National Natural Landmark (5,760 acres), Castle Gardens (80 acres), Devil's Gate (400 acres), and Martin's Cove (600 acres).

Extensive archeological investigations in intensive oil and gas development areas would protect as yet unknown cultural and/or natural history resources through the early identification and, if necessary, protection of important resources in the vicinity of the development area. Units expected to be beneficially affected by this management action would be Green Mountain, Beaver Creek, Gas Hills, and Dubois Area.

In addition, the standard protective measures of the oil and gas program would ensure adequate protection of the Sparhawk Cabin. Avoidance of the cabin site and its immediate surroundings by oil and gas operations would be feasible in nearly all cases.

**Adverse Impacts.** Alternative C would cause adverse impacts because of a lack of restrictions around certain important cultural resources. Oil and gas operations conducted on leases on one resource could adversely impact other resources through surface disturbances and intrusions. Resources in danger of disturbance would be most of the proposed South Pass National Register Mining District (11,235 acres).

The cumulative impacts of Alternative C's oil and gas management actions would be mostly beneficial. Thirty-three important cultural and natural history resource properties (covering 38,775 acres) would be protected from oil and gas-related impacts by no-surface occupancy restrictions. However, one important cultural resource (covering 11,235 acres) would be subject to oil and gas-related impacts. This situation would result in protection for most of the important affected cultural and natural history resources of the resource area from oil and gas-related impacts, but one important resource would remain in danger of adverse impacts from oil and gas activities.

##### Locatable Minerals

This program has limited standard protective measures (see Chapter II), especially for operations disturbing less than 5 acres. As a result, fewer important cultural or natural history resources would be adequately protected by standard protective measures for locatable minerals operations than by the standard protective measures of most other programs. The management actions in Alternative C would include significant effects on important cultural and natural history resources, some of which would be beneficial, and others could be adverse.



## Environmental Consequences

**Beneficial Impacts.** Alternative C would cause beneficial impacts through two forms of locatable minerals management actions. Plan of operations requirements would help to protect one cultural and natural history resource through the use of measures designed to locate, evaluate and if necessary, mitigate impacts to important resources affected by mining operations. Although there is a chance that operations could be allowed to proceed without adequate mitigation of impacts to some important resources, this situation would probably occur only rarely. Resources that would be covered by plan of operations requirements under this alternative would be the proposed South Pass National Register Mining District (11,900 acres). Withdrawals that close lands to mineral location and activity would also protect six important cultural resources through the prevention of locatable minerals-related surface disturbances and intrusions. These resources are Split Rock Landmark (640 acres), the Aspen Grove campsite (280 acres), part of the Rocky Ridge site (560 acres), Castle Gardens Rock Art site (80 acres), Devil's Gate Landmark (400 acres), and fragile lands along the Oregon/Mormon Trail (320 acres).

**Adverse Impacts.** Alternative C could cause adverse impacts because of a lack of restrictions around certain important resources. Mining operations, especially those disturbing less than 5 acres, conducted on 10 different resources, could adversely impact those resources through modern surface disturbances and intrusions. Resources in danger of disturbance would be the Sparhawk Cabin (10 acres), the Oregon/Mormon Trail corridor (those areas not covered by protective withdrawals - 26,140 acres), Ice Spring Slough (1,250 acres), part of the Rocky Ridge site (those areas not covered by protective withdrawals - 280 acres), the Gillespie Place/Radium Springs site (40 acres), Willies Handcart site (40 acres), Beaver Rim proposed National Natural Landmark (1,120 acres), Red Canyon National Natural Landmark (5,760 acres), the Martin's Cove site (600 acres), and Warm Spring Canyon (190 acres).

The cumulative impacts of Alternative C's locatable minerals management actions would be generally adverse. Ten important cultural and natural history resource properties (covering 35,430 acres) would be subject to locatable minerals impacts. Only seven important cultural resource properties (covering 14,180 acres) would be protected from mining impacts through plan of operations or no-mining restrictions. This

situation would result in continued vulnerability for most of the important affected resources of the resource area, although some important resources would be protected.

### Phosphates

This program has standard protective measures (see Chapter II) that should adequately protect many cultural resources. Beyond the standard measures, Alternative C's management action would cause significant impacts to one important natural history resource. The impacts would be adverse on this specific resource. The management action could open phosphate prospecting and leasing and could subject the Red Canyon National Natural Landmark (NNL) to phosphate mining-related surface disturbances and intrusions. The Red Canyon NNL covers 5,760 acres. Adverse impacts could occur because of the potential for phosphate-related activities.

The cumulative impacts of Alternative C's phosphate management action could be adverse. One important natural history resource property (covering 5,760 acres) would be subject to phosphate-related activities. This situation could result in the deterioration of an important affected natural history resource of the resource area from phosphate-related impacts.

### Management Actions for Landownership Adjustments and Utility Systems

This program has standard protective measures (see Chapter II) that should adequately protect many cultural resources. Beyond the standard measures, Alternative C's management actions would cause significant impacts to several important cultural and natural history resources. These management action impacts would be both adverse and beneficial, depending on the resource involved.

### Adverse Impacts

Alternative C could cause adverse impacts through some of the utility system management actions. Major utility systems allowed on eight cultural and natural history resource properties could adversely impact those sites through modern surface disturbances and intrusions. Resources in danger of disturbance are the Oregon/Mormon Trail (includes the Gillespie

## Environmental Consequences

Place/Radium Springs site, and Willies Handcart site - 26,950 acres), Ice Spring Slough site (1,250 acres), the entire Rocky Ridge site (840 acres), Beaver Rim proposed National Natural Landmark (1,120 acres), Red Canyon National Natural Landmark (5,760 acres), and Devil's Gate Landmark (400 acres).

Landownership adjustments management actions involving disposal of BLM-administered lands could adversely impact one important cultural resource property through the transfer of certain lands into non-BLM controls. Transfer of these lands (parcels 128, 129, 131, 132, 151, 153, 158, and 159) could result in permanent loss of important historical trail resources. These resources are part of the Oregon-Mormon Trail or are adjacent to the trail, and trail resources on 1,029 acres would be disposed of under this management action.

### Beneficial Impacts

Alternative C would cause beneficial impacts through the closure of major utility systems in some management units. Prohibition of major utility systems would benefit one important cultural resource through the continued preservation of its important values. This resource property is the proposed South Pass National Register Mining District (11,900 acres).

Standard procedures used in the utility systems management program would, in some cases, help ensure avoidance of adverse impacts on certain important cultural resources. Because of the situations of these resources, unfavorable topography, unique location, etc., utility systems would probably not be built near these resources; in that sense, a beneficial effect would occur. The resources likely to be avoided are Sparhawk Cabin (10 acres), Split Rock Landmark (640 acres), the Aspen Grove Campsite (280 acres), Castle Gardens (80 acres), Warm Spring Canyon (190 acres), and Martin's Cove (600 acres).

The cumulative impacts of Alternative C's locatable minerals management actions would generally be adverse. Eight important cultural and natural history resource properties (covering 36,320 acres) could be subject to impacts from utility systems. Part of one more resource property (covering 1,029 acres) would be subject to adverse impacts from land disposal actions. Only one important cultural resource property (covering 11,900 acres) would be protected from utility system impacts. Six other resources (covering 1,800 acres) would probably not be impacted by utility systems, primarily because of their locations. This situation would result in continued

vulnerability for most of the important affected resources of the resource area, although some important resources would be protected.

### Management Actions for Cultural/Natural History Resources

This program is oriented towards cultural and natural history resource protection, and all special management actions under this program would enhance the protection of selected important cultural and natural history resources. Alternative C would cause beneficial impacts through several special management actions, but could cause adverse impacts through the lack of special actions also.

### Beneficial Impacts

Management plans would help protect several cultural resource properties through the well thought out management of those resources. The resources would be the Oregon/Mormon Trail corridor (including the trail-related sites of the Split Rock Landmark, Ice Spring Slough, Rocky Ridge, Gilesie Place/Radium Springs, Willies Handcart Commemorative site, Devil's Gate Landmark, Martin's Cove, and Burnt Ranch (if acquired)), the proposed South Pass National Register Mining District (including five historical mining sites), and Red Canyon National Natural Landmark.

### Adverse Impacts

Alternative C would cause adverse impacts because of a lack of adequate management at a few important cultural resource sites. Without adequate management, destructive forces (natural and human-caused) could cause deterioration of two cultural resource properties. These properties are the Castle Gardens Rock Art site and the Warm Spring Canyon Flume, Natural Bridge and Geyser site.

In addition to the above, some important cultural and natural history resources would not be given special management but would not be adversely affected. Because of each property's good integrity and protected location, these resources would not suffer from a lack of special cultural/natural history program management at this time. These properties are the Sparhawk Cabin, the Aspen Grove site, and the Beaver Rim proposed National Natural Landmark.



## Environmental Consequences

The cumulative impacts of Alternative C's cultural/natural history management actions would generally be beneficial. Eleven important cultural properties would be protected through enhanced management, and three more resources would remain protected despite the lack of enhanced management. Two resource properties would, however, be subject to deterioration because of a lack of adequate management.

Conclusion. Alternative C would impact the affected cultural and natural history resources of the resource area in both adverse and beneficial ways, but would be the middle choice of all the alternatives from a cultural/natural history

resource protection viewpoint. Alternative C protects more important resources than Alternative A, but fewer resources than Alternative B in the Oil and Gas, Locatable Minerals, and Landownership programs. The most important resource (the Oregon/Mormon Trail and its sites) in the resource area would not be beneficially impacted for the most part by the Locatable and Landownership management actions under this Alternative. The South Pass Mining District, the second most important resource in the resource area, would also not be (generally) beneficially impacted by the Oil and Gas management actions (see table 4-8).

## Environmental Consequences

**TABLE 4-8**  
**EFFECTS ON SIGNIFICANT CULTURAL/  
NATURAL HISTORY RESOURCES**  
**ALTERNATIVE C**

Management Unit	Significant Resources	Management Actions	Resource Protected
Green Mountain	Sparhawk Cabin	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes (1) No Yes (1) Yes (2)
Beaver Creek	Oregon/Mormon Trail	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No No Yes (4)
	Oregon/Mormon Trail Sites —		
Beaver Creek	Split Rock Landmark	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes (1) Yes (4)
Beaver Creek	Ice Springs Slough	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No No Yes (4)
Beaver Creek	Rocky Ridge	Oil and Gas Locatable Minerals  Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Mostly Yes (3) Yes (1) Yes (4)
Beaver Creek	Gilesple Place/ Radium Springs	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No No Yes (4)
Beaver Creek	Willies Handcart Site	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No No Yes (4)
Beaver Creek	Beaver Rim Proposed NNL	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No No No
Beaver Creek	Burnt Ranch	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	N/A N/A N/A Yes (4)

## Environmental Consequences

**TABLE 4-8 (Continued)**  
**EFFECTS ON SIGNIFICANT CULTURAL/  
 NATURAL HISTORY RESOURCES**  
**ALTERNATIVE C**

Management Unit	Significant Resources	Management Actions	Resource Protected
Beaver Creek	Aspen Grove Campsite (an 1824 fur-trappers' campsite in the Sweetwater Canyon - see Wilderness Supplement for details)	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes (1) Yes (2)
Red Canyon	Red Canyon NNL	Oil and Gas Locatable Minerals Phosphates Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No No No Yes
South Pass	South Pass Proposed National Register Mining District	Oil and Gas No (3) Locatable Minerals  Landownership Adjustments and Utility Systems Cultural/Natural History	Somewhat  Yes Yes (3)
Gas Hills	Castle Gardens	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes (1) Somewhat Yes (3)
Gas Hills	Oregon/Mormon Trail	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No No Yes (4)
Gas Hills	Oregon/Mormon Trail Sites - Devils Gate Landmark	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes No Yes (4)
Gas Hills	Martins Cove	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes No Yes (1) Yes (4)

## Environmental Consequences

**TABLE 4-8 (Continued)**  
**EFFECTS ON SIGNIFICANT CULTURAL/  
 NATURAL HISTORY RESOURCES**  
**ALTERNATIVE C**

Management Unit	Significant Resources	Management Actions	Resource Protected
Dubois Area	Warm Spring Canyon Flume, Natural Bridge and Geyser	Oil and Gas	Yes
		Locatable Minerals	No
		Landownership Adjustments and Utility Systems	No
		Cultural/Natural History	No

- (1) - Resource would be protected by standard protection measures.
- (2) - Resource would not have special cultural/natural history program management, but would still be adequately managed.
- (3) - Part of site would be protected, part would not be protected.
- (4) - Managed according to the Oregon/Mormon Trail Management Plan recommendations.

# PREFERRED ALTERNATIVE

## Management Actions for Energy and Minerals

Under the preferred alternative, exploration and development, with minimal restrictions on areas known to contain valuable mineral resources (i.e., known geologic structures and areas with high potential for the occurrence of oil and gas), and restricted mineral activity on almost all of the area that contains unknown, low potential or low demand mineral resources would be allowed. The only commodity that could not be explored or developed under the preferred alternative is the low-grade phosphate deposits in the Lander Slope and Red Canyon Management units. All other commodities would be available for exploration and development, either restricted or unrestricted, some place within the Lander Resource Area.

### Oil and Gas

Table 4-1 shows the acreage under seasonal, no-surface occupancy, and no-lease restrictions, plus the acreage within each oil and gas potential occurrence category for each management unit. Area-wide no-surface occupancy restrictions would cover approximately 150,000 acres, or 5 percent of the resource area.

In areas with high potential for the occurrence of oil and gas and in areas with established production such as KGSSs, oil and gas management actions under the preferred alternative would ensure timely and efficient exploration and development of oil and gas. New oil and gas leases in these high-potential areas would be conditioned with no-surface occupancy and seasonal restrictions on a case-by-case basis and only when necessary to avoid a significant adverse impact on another resource. Even more acreage could be opened to oil and gas operations if the operator showed or the BLM determined that adverse effects to other significant resources could be adequately mitigated or if plans of operations or leases restrictions would protect these resources, thus resulting in a waiver of the restrictions by BLM. Drainage of federal oil and gas reserves by wells drilled on private and state lands would be avoided.

In areas of low, moderate, or no potential for occurrence of oil and gas in all management units, no-surface occupancy and seasonal restrictions

would cause untimely and inefficient development of subsurface resources. No-surface occupancy restrictions would preclude surface disturbing geophysical exploration and thus oil and gas reservoirs might not be discovered. However, areas without surface restrictions would be available for timely and efficient oil and gas operations and would be open for the potential discovery of oil and gas reservoirs.

Preferred alternative management actions that would consider disposal of tracts of land in the Green Mountain, Beaver Creek, Lander Slope, Gas Hills, Dubois Badlands, and Dubois Area Management units would adversely impact known oil and gas resources by hindering exploration and development. Even if the mineral estate were reserved to the United States, negotiations between surface owners and mineral operators could cause delays and increased cost through compensation for surface damages.

### Locatable Minerals

Under the preferred alternative, 99 percent of the public land in the 10 management units would be open to prospecting, exploration and development of locatable minerals. The mineral resource would benefit by being available for discovery and development over almost the entire resource area. The only management unit that would be entirely closed to locatable mineral activities would be the Whiskey Mountain unit. Locatable minerals in this unit would not be discovered or developed. The remaining units would be almost entirely open, except for existing and proposed withdrawals.

Management actions would require a plan of operations for exploration and development of approximately 1 percent of the acreage open to locatable mineral entry. This restriction could cause delays in the development of the mineral resource and could deny use of the most efficient exploration and mining methods.

Management actions for off-road vehicles would put restrictions on ORV use in all management units. This would cause lost time while claimants and prospectors waited for approval to use off-road vehicles.

Management actions that would consider disposal of tracts of land in the Green Mountain, Beaver Creek, Lander Slope, Gas Hills, Dubois Badlands, and Dubois Area Management units would adversely impact known locatable mineral resources by hindering exploration and development. Even if the mineral estate were

## Environmental Consequences

reserved to the United States, negotiations between surface owners and mineral operators could cause time delays and increased cost through compensation for surface damages.

### Phosphates

Under the preferred alternative, phosphate prospecting, exploration and development, and leasing would be allowed with the restrictive measures described in Appendix 2. If under these restrictive measures mining could occur, impacts would be the same as those described in Alternative C (phosphates would be recovered). If, on the other hand these restrictions prevented mining, the impacts would be the same as those in Alternative A (phosphate resources would not be developed).

### Other Actions

The preferred alternative would allow withdrawal of lands around Sinks Canyon State Park from mineral entry, thus precluding any mineral resources in that area from being discovered or developed.

A detailed description of the segregated and withdrawn areas, plus the areas that would have seasonal and no-surface occupancy restrictions for each energy and mineral resource can be found in Chapter II, Alternatives Including the Proposed Action.

**Conclusion.** The alternatives for energy and minerals display a wide range of management actions that vary from providing minimal restraints on mineral activity to applying extensive restrictions on mineral activity. Although Alternative A would be the most adverse toward leasing, exploration and development of oil and gas, Alternative B would limit all mineral activity to a greater extent overall. Alternative C would maximize the acreage that would be open to oil and gas and other mineral activity. Implementation of the preferred alternative would also keep the largest possible area open to mineral exploration and development, yet at the same time it would provide protection of sensitive and significant surface resources.

## Soils, Water and Air Quality

### Management Actions for Energy and Minerals

#### Oil and Gas

In the preferred alternative all management units would be subject to some impacts from oil and gas activity, except the Whiskey Mountain Management Unit. Overall, impacts from oil and gas activity would be the same or less than on all other alternatives, except on the Dubois Badlands Management Unit. Alternative A would have slightly less significant impacts than this alternative because of the closure of this unit to new oil and gas leasing.

As in the other alternatives, all management units would be open to some exploration, development and reclamation activities, except the Whiskey Mountain Management Unit. The major exploration activity of oil and gas development is seismographic investigations. Impacts associated with seismographic investigations are: vegetative cover destruction, soil compaction, gully and rill erosion, and streambank disturbance. All these impacts would result in accelerated erosion rates and potentially increased levels of sediment into adjacent live streams.

The most significant impacts to soil, watershed and air quality occur during development of oil and gas resources. Impacts are similar to those that occur with seismographic activities; however, impacts are generally concentrated on individual well locations, which average approximately 8 acres in size. An additional problem encountered with site development is salt loading. This is not common but becomes a significant problem when previously nonsaline soils become saline from drastic soil disturbance on oil and gas development sites, which restricts drainage or lowers the water table. Salt loading might limit reclamation success by restricting the growth of native species on reclaimed sites.

Most reclamation efforts are directed at reducing accelerated soil erosion and establishing native vegetation on disturbed sites. In the short-



## Environmental Consequences

term it takes an average of 3 to 5 years to establish adequate vegetation to control accelerated erosion on disturbed sites. In the long-term, it takes a substantially longer period of time to establish permanent native vegetation and to increase site fertility. On most disturbed sites, soil characteristics (soil physical, chemical and biological properties), will not return to their pre-disturbance levels. This is an irreversible and irretrievable impact.

Air quality in producing areas can be adversely impacted by vehicle emissions, dust, and potentially dangerous gases emitted from producing wells. These impacts may be significant in the short term (i.e., during well development and production phases, in a localized area) and insignificant in the long term (following well closure).

### Locatable Minerals

Generally, impacts from locatable mineral exploration and development to soil, watershed, and air quality would be the least significant of all alternatives in the Preferred Alternative. Impacts on the Green Mountain, Beaver Creek, Gas Hills, East Fork, and Whiskey Mountain Management units would be moderately less than in Alternative A, the same or slightly less than they are in Alternative B, and much less than in Alternative C. On the Lander Slope, Red Canyon, South Pass, and Dubois Area Management units, impacts would be slightly less than those in Alternative A, about the same as in Alternative B, and much less than in Alternative C. For the Dubois Badlands Management Unit, impacts would be about the same as alternatives A and B and moderately less than for Alternative C.

As in the other alternatives with exploration and development of locatable minerals, disturbed lands would be subject to soil compaction and accelerated wind and water erosion. Water quality related values would be affected by increased sediment loads in disturbed watersheds. Air quality values would have the potential to be degraded, depending on the amount of activity from locatable mineral exploration and development.

### Phosphates

Only the Lander Slope and Red Canyon Management units would have the potential to be impacted by phosphate resource development in the Preferred Alternative. Impacts would be the same for this alternative as they would be in alternatives A and B, and significantly less than

they would be in Alternative C. Impacts would be similar to those discussed under locatable mineral exploration and development.

### Management Actions for Fish and Wildlife

Overall, impacts to soil, watershed and air quality would not be significantly different in the long-term under the Preferred Alternative or other alternatives with the recommended management actions for fish and wildlife.

On the Beaver Creek, Gas Hills, East Fork, Dubois Badlands, Whiskey Mountain, and Dubois Area Management units under management actions for fish and wildlife, impacts to soil, watershed and air quality would be the same as under the other alternatives.

For the Green Mountain, Lander Slope and South Pass Management units, actions would be the same as they are in Alternative C. In the short-term there would be an increase in impacts to soil, watershed and air quality in these units compared to alternatives A and B. In the long-term, i.e., following vegetation re-establishment on prescribed burn areas, impacts would be the same or less than under alternatives A and B.

### Management Actions for Forestry

Overall, impacts from timber harvesting and management would be slightly less or the same than expected on Alternative C and slightly more or the same than expected on alternatives A and B. Impacts on the Green Mountain and South Pass Management units would be less than expected with Alternative C and slightly more than expected with alternatives A and B. Significant reductions of impacts on the Lander Slope Management Unit would be expected on the Preferred Alternative, compared to alternatives B and C and much more impact than would be expected on Alternative A. Significant reductions in impacts on the Red Canyon Management Unit would be expected on the Preferred Alternative compared to Alternative C, much more impact than expected under Alternative B, and moderately more impact than expected under Alternative A.

All other management units would have similar impacts from timber harvesting and management in the Preferred Alternative as in the other alternatives. On all management units, timber harvesting would increase erosion and resultant

## Environmental Consequences

sedimentation from removal of forest cover and from road disturbance associated with logging operations, in the short term. Soil compaction would increase the potential for surface runoff, accelerated erosion, and increased sedimentation in roadways, landings and skid trails from heavy equipment use, in the short-term. In the long term, site productivity might be significantly reduced on compacted areas.

If slash piles were burned following timber harvesting, soil nutrient enrichment and scarification for seedbed preparation would be a beneficial impact on these areas.

### Management Actions for Access

In silty and fine sandy loam soil textures, air quality might be degraded during road construction and heavy local traffic use. These impacts would be insignificant and restricted to areas of local disturbance.

### Management Actions for Landownership Adjustments and Utility Systems

Overall, impacts from installation of utility systems should be less significant in the Preferred Alternative than all other alternatives because 6 of the 10 units would be avoided by major utility corridors. Impacts on the Green Mountain, Beaver Creek, Gas Hills, and Dubois Area Management units would be the same as under the other alternatives. These impacts would result in slight to moderately significant disturbance in the short term. The Red Canyon, South Pass, Lander Slope, East Fork, Dubois Badlands, and Whiskey Mountain Management units would have minimal to no impacts from utility system installation since they would be avoided when locating major utility systems.

### Management Actions for Off-Road Vehicles (ORVs)

Impacts from ORV use would be the same as they are in Alternative B for all management units. Overall, impacts to soil, watershed and air quality would be slightly less than expected in alternatives A and C. Impacts from ORV use would occur during the season of use and for those periods when the soil was not frozen or snow covered. The major impacts would be soil compaction and

accelerated wind and water erosion, depending on the amount of traffic and how the road would be engineered and maintained.

### Management Actions for Fire

Overall, a balance of minimum impacts from fire suppression equipment and minimum impacts from wildfire damage would be expected in the Preferred Alternative. On the Green Mountain, Lander Slope and Red Canyon Management units, impacts from full or limited suppression would be the same as in Alternative B. South Pass, East Fork, Dubois Badlands, and Dubois Area Management units would have impacts similar to Alternative A, where full fire suppression has been recommended. Where limited suppression has been recommended on the Whiskey Mountain Management Unit, impacts would be the same as in Alternative C. The Beaver Creek and Gas Hills Management units would have a combination of impacts from all three alternatives, depending on the zone of fire occurrence.

As was stated in Alternative A, impacts from full suppression would be mainly from use of heavy equipment. Impacts associated with use of heavy equipment include soil compaction, increased wind and water erosion, reduced site productivity, and increased sedimentation. These impacts would have significant short-term effects on the affected areas.

Where management actions were to limit the use of heavy equipment on fires, as on the Green Mountain, Lander Slope and Red Canyon Management units, impacts might still occur from heavy equipment although to a lesser extent. In addition, the possibility of burning more acreage, because of limiting heavy equipment use, might result in other significant impacts. One impact would be to increase the potential for soil erosion until vegetation has been reestablished. The other impact would be a significant reduction in site productivity on some areas damaged by intense wild fire, e.g., in areas of high soil organic matter content and with substantial downed timber. These impacts would be significant in the short term or long term depending on extent and location of the impacts. In addition, local air quality would be degraded during wildfire events, a short-term impact.

Impacts from limited suppression on Whiskey Mountain Management Unit would be the same as discussed under Alternative C. If a management decision were made to allow wild fires to burn, two significant impacts might occur. One impact

## Environmental Consequences

would be to increase the potential for soil erosion until vegetation has been reestablished. The other impact would be to cause a significant reduction in site productivity on some areas damaged by intense wild fire, e.g., in areas of high soil loss. These impacts would be significant in the short term or long term, depending on the extent and location of the impacts. In addition, local air quality would be degraded during wildfire events, a short-term impact.

Impacts to soil, watershed and air quality on the Beaver Creek and Gas Hills Management units would be a combination of all or part of the impacts previously discussed.

If prescribed burns were permitted, they could adversely affect surface water quality, accelerate soil erosion and degrade air quality. In properly planned prescribed fires, these effects could be minimal and held to acceptable levels. As vegetation increased after a prescribed fire project, accelerated erosion rates would decrease and water quality would increase.

## Fish and Wildlife

### Management Actions for Energy and Minerals

#### Oil and Gas

The Green Mountain, Beaver Creek, Lander Slope, Red Canyon, South Pass, Gas Hills, and Dubois Area Management units would be open for oil and gas leasing. High-potential oil and gas areas and KGSs would be subject to no-surface occupancy and seasonal stipulations on a case-by-case basis to protect significant resource values. New leases in moderate, low and no potential oil and gas areas would also be conditioned with no-surface occupancy and seasonal restrictions.

No-surface occupancy stipulations designed to protect water quality, fisheries, steep slopes and riparian areas would result in significant beneficial impacts to fish, waterfowl, game birds, beaver, big game, and a variety of other animals. The high-priority standard habitat sites associated with riparian areas and steep slopes would also be protected from oil and gas disturbances.

Seasonal restrictions would provide long-term benefits to big game on crucial winter ranges, elk on calving areas, sage grouse on strutting grounds, and raptors during the nesting periods by eliminating unnecessary stress, disturbance

and displacement caused by oil and gas activities. Seasonal restrictions during critical periods might help reduce mortality, ensure reproductive success and survival of young, and reduce conflicts with adjacent landowners caused by displaced animals.

However, habitat losses associated with oil and gas activities during the noncritical period indicated that adverse impacts could occur to big game herds over the next 60 years. These habitat losses are projected by comparing the overlap between high and moderate oil and gas areas and big game high-value habitats, such as calving areas and crucial winter ranges (refer to Environmental Consequences, Introduction - Habitat Losses).

In the Dubois Badlands Management Unit, no-surface occupancy restrictions within the wilderness study area boundaries would protect a large portion of the bighorn sheep yearlong range and elk winter range from habitat disturbance. However, surface disturbance could cause adverse impacts to big game. The degree of impact would depend on the location and extent of oil and gas activity.

No-surface occupancy restrictions to protect water quality, fisheries, riparian areas, sage grouse strutting grounds and steep slopes would benefit the Wind River fishery resource as well as many other wildlife species. High-priority habitat sites associated with riparian areas and steep slopes would also be protected. Exploration activities could cause additional stress to the resident bighorn sheep population. Since Rocky Mountain bighorn sheep are infected with lungworm, any additional stress increases the risk of a die off.

In the East Fork Management Unit, impacts to wildlife would be the same as in Alternative A. Issuing oil and gas leases with no-surface occupancy restrictions would protect important elk and bighorn sheep ranges, stream fisheries and several high-priority standard habitat sites. Because of the high density of elk that winter on the East Fork Management Unit, drilling on existing leases would cause adverse impacts to this elk herd. It would also impact fisheries and moose habitat.

In the Dubois Badlands Management Unit, no-surface occupancy restrictions within the wilderness study area boundaries would protect a large portion of the bighorn sheep yearlong range and elk winter range from habitat disturbance. However, surface disturbance could cause adverse impacts to big game. The degree of impact would depend on the location and extent of oil and gas activity.

## Environmental Consequences

The Whiskey Mountain Management Unit would remain closed to oil and gas leasing, exploration and development, resulting in significant long-term benefits to the nationally significant bighorn sheep herd.

**Conclusion.** No-surface occupancy and seasonal restrictions would offer some protection to a variety of fish and wildlife species and priority habitats in the Green Mountain, Beaver Creek, Lander Slope, Red Canyon, South Pass, Gas Hills, and Dubois Area Management units. However, habitat losses caused by oil and gas activities could significantly impact several big game herds in these management units over the next 60 years.

No-surface occupancy and seasonal restrictions over a large portion of the Dubois Badlands Management Unit would benefit bighorn sheep, elk and fisheries in the Wind River. However, exploration activities could negatively impact the resident bighorn sheep herd.

No new leases in the East Fork and Whiskey Mountain Management units would provide significant long-term benefits to bighorn sheep and elk.

### Locatable and Other Minerals

Alternative A was chosen as the preferred alternative for the Dubois Area Management Unit. The unit would be open for exploration and development of locatable minerals, except for Warm Springs Canyon. Withdrawing Warm Springs Canyon would protect important trout fisheries and raptor nesting areas, resulting in long-term beneficial impacts. Although mineral development is unlikely to occur in the near future, any habitat loss displacements caused by Placer mining in streams could be detrimental to moose, fisheries and a variety of species dependent on riparian habitat. Any additional disturbances in the mule deer crucial winter range would be detrimental to the herd.

Alternative B was chosen as the preferred alternative for the East Fork and Whiskey Mountain Management units. The units would be closed to exploration and development of locatable minerals. The exceptionally high fish and wildlife values, particularly bighorn sheep and elk in these units, would be protected. Significant long-term benefits to fish and wildlife resources would occur.

Alternative B was also chosen as the preferred alternative for the Gas Hills Management Unit. The area would be open for exploration and development of locatable minerals, except within

several historical sites. Extensive mineral development could cause significant long-term adverse impacts to mule deer, antelope, sage grouse, and raptors.

A modified alternative was selected as the preferred alternative for each of the remaining management units. The units would be open for exploration and development of locatable minerals, except in areas already segregated or withdrawn from mineral entry. A plan of operation would be required within certain areas.

The risk of stressing and displacing wintering big game on the Lander Slope and Red Canyon Management units would increase under the preferred alternative. Habitat losses associated with exploration and development activities could significantly impact the high-value wildlife resources, although a plan of operation would attempt to minimize these impacts.

In the South Pass Management Unit, impacts to wildlife would be similar to Alternative A only less severe because a plan of operation would be required. Some high-priority habitat types would be disturbed and the Lander moose herd, trout fisheries, beaver pond ecosystems, and other wildlife species could be negatively impacted. Withdrawal of the current segregated lands would protect some high-value habitat and fish and wildlife resources.

The Green Mountain elk herd and trout stream habitat could still be negatively impacted under the preferred alternative, although the required plan of operation would attempt to mitigate some of these impacts.

In the Beaver Creek Management Unit, a plan of operation would attempt to reduce impacts to nesting raptors along Beaver Rim. Uranium development could adversely impact sage grouse and raptors, and zeolite development could cause negative impacts to mule deer.

A plan of operation would be required for the area previously included in the Dubois Badlands Wilderness Study Area, but the risk of stressing and displacing the resident population of bighorn sheep would be increased. Impacts to the fishery resources and other wintering big game species could probably be mitigated in the plan of operation.

Phosphate prospecting, exploration and leasing would be allowed for the Lander Slope and Red Canyon Management units with the standard protective requirements for surface-disturbing activities (see Appendix 2). These protective requirements would minimize impacts to high-value fish and wildlife resources.



## Environmental Consequences

Withdrawing the lands around Sinks Canyon State Park would provide significant benefits to nesting raptors and the bighorn sheep herd.

**Conclusion.** Fish and raptors in Warm Springs Canyon, elk on the East Fork Management Unit, bighorn sheep on the Whiskey Mountain Management Unit, as well as many other fish and wildlife species, would benefit significantly under the preferred alternative. The risk of stressing and displacing big game in the Lander Slope, Red Canyon, Green Mountain, and Dubois Badlands Management units would increase depending on the extent of mining activity and the effectiveness of mitigative plans. Some impacts could occur to fish and wildlife on the remaining management units, depending on the amount and duration of habitat disturbance.

### Management Actions for Fish and Wildlife

For the Beaver Creek, East Fork, Dubois Badlands, Whiskey Mountain, and Dubois Area Management units, Alternative A is the preferred alternative. Existing fish and wildlife habitat improvements would be maintained and routine habitat improvements would be completed to enhance and maintain fish and wildlife resources. Fish and wildlife species and habitat would benefit significantly from these actions.

Bighorn sheep management would be the top wildlife priority on the Whiskey Mountain Management Unit, while management actions would focus on wintering elk herds on the East Fork and Red Canyon Management units. Fisheries management would be emphasized in the South Pass and part of the Beaver Creek Management units. These management actions, directed at specific fish and wildlife species, would not only provide significant long-term benefits to these priority species but to many other species as well.

Prescribed burning techniques would be used to increase big game winter forage and to regenerate aspen and willow stands in the Green Mountain, South Pass, Red Canyon, and Lander Slope Management units. Wintering elk, moose, mule deer, and bighorn sheep would benefit significantly, as well as many other fish and wildlife species.

In the Gas Hills Management Unit BLM would continue to cooperate with the Wyoming Game and Fish Department, interested sportsmen, conservation groups and adjacent landowners in

efforts to develop a workable bighorn sheep reintroduction program for the Swsewater Rocks. If a workable program could be developed, bighorn sheep would significantly benefit from reestablishment of a viable population.

**Conclusion.** Maintenance of existing fish and wildlife improvements and completion of improvements would significantly benefit many fish and wildlife species in all management units. Emphasizing management of a particular priority species on specific units would not only provide significant long-term benefits to that species but many other fish and wildlife species as well. If a bighorn sheep reestablishment program could be developed and implemented, bighorn sheep would receive significant long-term benefits.

### Management Actions for Forestry

Fish and wildlife objectives and habitat needs would be considered in all management units. This would benefit deer and elk on the Green Mountain Management Unit, moose and trout on the Red Canyon and South Pass Management units, big game on the Lander Slope Management Unit, bighorn sheep on the Whiskey Mountain Management Unit, elk on the East Fork Management Unit, and a variety of fish and wildlife resources on the remaining management units.

### Management Actions for Landownership Adjustments and Utility Systems

Under the preferred alternative, the rationale for all management units would be to not dispose of lands where a land-use change might occur that would cause significant adverse impacts to fish and wildlife resources. Landownership adjustments for the East Fork and Whiskey Mountain Management units would only be completed if they were compatible with fish and wildlife objectives. No impacts to wildlife would be anticipated under the preferred alternative.

### Management Actions for Recreation

Closing the Red Canyon Management Unit to winter recreational activities would ensure that the wintering elk herd would not be distressed or displaced by winter recreationists.

## Environmental Consequences

### Management Actions for Off-Road Vehicles (ORVs)

Yearlong closure of the Dubois Badlands to ORVs would protect fragile fish and wildlife resources in this unit. Vegetation that supplies essential forage for elk and bighorn sheep would be maintained, and erosion would be minimized, reducing the effects of siltation on fisheries.

Winter closures in the Green Mountain, Lander Slope, Red Canyon, and parts of the Whiskey Mountain Management units would help reduce the effects of stress and disturbance of wintering big game and the siltation of fisheries during early spring. Snowmobile restrictions in the Red Canyon Management Unit would be especially helpful in reducing stress and disturbance to wintering elk and mule deer.

Limiting ORV use to existing roads and trails in the nine management units that would not be closed year round would help prevent further terrestrial habitat losses and deterioration of fisheries that would otherwise result from the proliferation of new roads.

### Management Actions for Fire

Full or limited suppression would be recommended on all management units. Full suppression could have beneficial or adverse impacts on fish and wildlife resources. Restricting the use of heavy equipment in areas with fragile soils or steep slopes, when the risk of a catastrophic fire is low, would benefit fish and wildlife resources.

### Management Actions for Access

Alternative A is the preferred alternative for the Red Canyon, South Pass, East Fork, Dubois Badlands, and Whiskey Mountain Management units. The existing transportation would be maintained in these units, resulting in no impacts to wildlife.

Alternative B is the preferred alternative in the Green Mountain, Beaver Creek, Lander Slope, Gas Hills, and Dubois Area Management units. Public access would be sought on 12 roads in these units. Beneficial impacts to fish and wildlife would occur from obtaining public access on all 12 roads.

### Forestry

#### Management Actions for Energy and Minerals

##### Oil and Gas, Uranium and Other Locatable Minerals

The preferred alternative for the Green Mountain and South Pass Management units is Alternative C. Under this alternative, the units would be open for leasing, exploration and development of oil and gas, uranium and other locatable minerals, under certain guidelines. The impacts from the alternative include:

1. The amount of available timber would be reduced.
2. Some land could be permanently removed from timber production.
3. In some areas, this could create a beneficial impact by replacing nonsaleable quality timber with regeneration.
4. In other areas, this could create an adverse impact by removing healthy stands over a long period.

There are no irreversible or irretrievable impacts under any of these alternatives, including the preferred.

**Adverse Impacts.** The following impacts could occur from oil and gas developments.

1. Deplete resources and reduce timber production in the short term.
2. Remove healthy stands of timber in the short term.
3. Lose growth potential in some areas over the long term.
4. Increased soil erosion from access roads.

**Beneficial Impacts.** The following impacts could occur from oil and gas developments.

1. Create opportunities for regeneration in the long term.
2. Remove stagnant stands and thereby increase growth rate in the long term.
3. More access roads would improve access to dead timber and improve the stands in the short term. Improving access roads could also reduce soil erosion in the short term.



## Environmental Consequences

On the South Pass unit, there would be no additional significant impacts to the forest resources from this alternative.

Alternative B is the preferred alternative for Lander Slope. Under this alternative, the area would be open to leasing, exploration and development of oil and gas, uranium and other locatable minerals. There would be no significant impacts to the forest resource in this unit.

### Management Actions for Forestry

The preferred alternative for the Green Mountain and South Pass Management units is Alternative C. Under this alternative, timber harvesting on Green Mountain would involve approximately 2 MMBF of sawtimber and 1.5 to 2 MMBF of fuelwood and other wood products per year. This level of harvest would deplete the larger trees, allowing for regeneration. The management action under this alternative would create a more organized, systematic and intensive management regime and produce optimum growth conditions for the mountain. This method would also reduce the possibility of a beetle epidemic.

**Adverse Impacts.** The following impacts could occur as a result of management actions for forest management.

1. Deplete large timber in certain areas in the short term.
2. Increase in access roads could permanently remove land from the forest land base (2 to 2.5 acres per mile) in the long term.

**Beneficial Impacts.** The following impacts could occur as a result of management actions for forest management.

1. Thinning of stands would transfer growth potential to young, vigorous trees and increase growth rates in the short term and long term.
2. Harvesting on a compartment basis would create uneven-aged stands, which would reduce chances of a beetle epidemic in the long term.
3. Large harvests would create employment and generate revenues in the short term.

This alternative would not have any additional significant impacts on the forest resources in the South Pass Management Unit.

The preferred alternative for the Lander Slope is a modified Alternative B. The only change would be the addition of one or more timber sales in the unit. Timber would be harvested at a high level under this alternative, which would replace larger timber with young, healthy stands of regeneration. This would increase the growth rate of stands and, in the long term, produce a high and more reliable sustained yield figure. To reach the timbered areas, access roads would have to be upgraded or constructed. This would have a beneficial impact of creating access to dead and dying stands for cutting fuelwood and sawlogs.

### Management Actions for Fire

The preferred alternative for the Green Mountain and South Pass Management units is Alternative C, which is limited suppression. This management action would have a beneficial impact on the lodgepole pine and aspen stands by replacing old stands with young, healthy regeneration.

The preferred alternative for Lander Slope is full suppression. This action would have a beneficial impact on the Douglas fir stands on the slope by preventing a total loss of stands. If the stands were destroyed by fire, it would be a long-term, adverse impact because it would destroy the potential growth in the area.

**Full Suppression.** The following impacts could occur as a result of management actions for fire using full suppression.

- Adverse impact to lodgepole pine because it needs to be cleared on a regular basis in order to regenerate.
- Would be beneficial to Douglas fir because fire would destroy any chances of regeneration.

**Limited Suppression.** The following impacts could occur as a result of management actions for fire using limited suppression.

- Would be a beneficial impact to lodgepole pine because fire is an efficient and inexpensive method of clearing decadent stands in the short term.
- Would be an adverse impact to Douglas fir, because immediate regeneration of burned areas would not occur, as with lodgepole pine.

Lack of forest management would have an adverse impact on forest resources in all management units because unmanaged stands

## Environmental Consequences

would suffer from increased mortality as a result of old age, disease and beetle infestations. Thinning and harvesting prevents this deterioration and benefits the stands in the long term by allowing regeneration and transferring growth potential to the young, vigorous stands.

**Conclusion.** The magnitude of the impacts resulting from this alternative would vary, depending on the size of the forest resource, the level of development of any oil and gas, uranium or other locatable minerals, the size of the reserve, and the length of time the field is under production.

For more detailed information on the location of these types of impacts and their causes, see table 4-5.

### Cultural/Natural History Resources

#### Management Actions for Energy and Minerals

##### Oil and Gas

This program has standard protective measures (see Chapter II) that should adequately protect many cultural resources. Beyond the standard measures, the preferred alternative's management actions would cause significant impacts to several important cultural and natural history resources. These impacts would be beneficial for all the affected resources involved.

The preferred alternative would cause beneficial impacts through two forms of oil and gas management actions. No-surface occupancy restrictions would protect 10 important cultural and natural history resources through the prevention of oil and gas-related surface disturbances and intrusions. These resources are the Oregon/Mormon Trail corridor (includes the Gillespie Place, Radium Springs site, part of the Rocky Ridge site, and the Willies Handcart Commemorative site - 26,950 acres), the Beaver Rim proposed National Natural Landmark (1,120 acres), the Ice Spring Slough proposed National Register site (1,250 acres), the proposed South Pass National Register Mining District (11,900 acres), the Red Canyon National Natural Landmark (5,760 acres), the Warm Spring Canyon Flume, Natural Bridge and Geyser site (190 acres), Martins Cove (600 acres), and the Castle Gardens Rock Art site (80 acres).

Continuing existing withdrawals, which have the affect of denying the leasing of oil and gas, also protect four important cultural resources through the prevention of oil and gas-related surface disturbances and intrusions. These withdrawals, totaling 2,200 acres, were made in October 1970. They protect the Split Rock Landmark (640 acres), part of Rocky Ridge (560 acres), the Aspen Grove Campsite (280 acres), the Devil's Gate Landmark (400 acres) and fragile lands along the Oregon/Mormon Pioneer Trail (320 acres). In addition, the standard protective measures of the oil and gas program would ensure adequate protection of the Sparhawk Cabin. Avoidance of the cabin site and its immediate surroundings by oil and gas operations would be feasible in nearly all cases.

These cumulative impacts of the Preferred Alternative's oil and gas management actions would be beneficial. Fifteen important cultural and natural history resource properties (covering 50,050 acres) would be protected from oil and gas-related impacts by either no-surface occupancy or no leasing restrictions. This situation would result in protection for all of the important affected cultural and natural history resources of the resource area from oil and gas-related impacts.

##### Locatable Minerals

This program has limited standard protective measures (see Chapter II), especially for operations disturbing less than 5 acres. As a result, fewer important cultural or natural history resources would be adequately protected by standard protective measures for locatable minerals operations than by the standard protective measures of most other programs. The management actions in the preferred alternative would include significant effects on important cultural and natural history resources, all of which would be beneficial. The preferred alternative would cause beneficial impacts through two forms of locatable mineral management actions. Plan of operations requirements would help to protect eight important cultural and natural history resources through the use of measures designed to locate, evaluate, and if necessary, mitigate impacts to important resources affected by mining operations. Although operations might be allowed to proceed without adequate mitigation of impacts to some important resources, this situation would occur only rarely. Resources that would be covered by plan of operations requirements under this alternative are Sparhawk Cabin (10 acres), the Oregon/Mormon Pioneer Trail corridor

## Environmental Consequences

(includes the Gillespie Place/Radium Springs site, and the Willies Handcart Commemorative site - 26,140 acres), Beaver Rim proposed National Natural Landmark (1,120 acres), Red Canyon National Natural Landmark (5,760 acres), most of the proposed South Pass National Register Mining District (11,310 acres) and the Ice Spring Slough site (1,250 acres).

Withdrawals that close lands to mineral location and activity would also protect eight important cultural resources through prevention or reduction of locatable minerals-related surface disturbances and intrusions. These resources are Split Rock Landmark (640 acres), the entire Rocky Ridge site (840 acres), the Aspen Grove site (280 acres), Castle Gardens Rock Art site (80 acres), Devil's Gate Landmark (400 acres), fragile lands along the Oregon/Mormon Trail (320 acres), the presently segregated lands in the South Pass National Register Mining District (590 acres), Martins Cove (600 acres), and Warm Spring Canyon (190 acres).

The cumulative impacts of the preferred alternative's locatable minerals management actions would be beneficial. Sixteen important cultural and natural history resource properties (covering 49,530 acres) would be protected from mining impacts through plans of operations or no mining restrictions. This situation would result in some degree of protection for all of the affected resources of the Resource Area.

### Phosphates

This program has standard protective measures (see Chapter II) that should adequately protect many cultural resources. Beyond the standard measures, the preferred alternative's management action would cause significant impacts to one important natural history resource. The impacts would be beneficial on this specific resource. The management action would close phosphate prospecting and leasing and would protect the Red Canyon National Natural Landmark (NNL), through the prevention of phosphate mining-related surface disturbances and intrusions. The Red Canyon NNL covers 5,760 acres. No adverse impacts would occur because of the total prevention of phosphate-related activities.

The cumulative impacts of the preferred alternative's phosphate management action would be beneficial. One important natural history resource property (covering 5,760 acres) would be protected from all phosphate-related activities. This situation would result in the protection of an important affected natural history resource of the resource area from phosphate-related impacts.

## Management Actions for Landownership Adjustments and Utility Systems

This program has standard protective measures (see Chapter II) that should adequately protect many cultural resources. Beyond the standard measures, the preferred alternative's management actions would cause significant impacts to several important cultural and natural history resources. These management action impacts would be both adverse and beneficial, depending on the resource involved.

### Adverse Impacts

The preferred alternative could cause adverse impacts through some of the utility system management actions. Major utility systems allowed on three cultural and natural history resource properties could adversely impact those sites through modern surface disturbances and intrusions. These endangered resources are Ice Spring Slough site (that portion outside the Oregon/Mormon Trail corridor - 600 acres), and Beaver Rim proposed National Natural Landmark (1,120 acres).

### Beneficial Impacts

The preferred alternative would cause beneficial impacts through the closure or restriction of major utility systems in some management units. Prevention or restriction of major utility systems would benefit 10 important cultural resources through the continued preservation of their important values. These resource properties are the Red Canyon National Natural Landmark (5,760 acres), the proposed South Pass National Register Mining District (12,900 acres), the Oregon/Mormon Trail corridor (including Gillespie Place/Radium Springs, and Willies Handcart Site - 26,950 acres), Split Rock Landmark (640 acres), all of Rocky Ridge (840 acres), the Aspen Grove Campsite (280 acres), Devil's Gate 400 acres), and Martins Cove (600 acres).

Landownership adjustments management actions involving retention of BLM-administered lands could beneficially impact one important cultural resource property through the retention of certain lands by BLM. Retention of these lands would result in the continued protection of important historical trail resources. These resources are part of the Oregon/Mormon Trail, and 869 acres with trail resources would be preserved in their present state under this management action.

## Environmental Consequences

Standard procedures used in the utility systems management program would, in some cases, help ensure avoidance or adverse impacts on certain important cultural resources. Due to the situations of these resources, unfavorable topography, unique location, etc., utility systems would probably not be built near these resources; in that sense, a beneficial effect would occur. The resources likely to be avoided are Sparhawk Cabin (10 acres), Warm Spring Canyon (190 acres), and Castle Gardens (80 acres).

The cumulative impacts of the preferred alternative's landownership adjustments and utility systems management actions would generally be beneficial. Two important cultural and natural history resource properties (covering 1,720 acres) would be subject to impacts from utility systems. Ten important cultural resource properties (covering 47,190 acres) would be protected from utility system impacts, and three other important resources (covering 280 acres) would probably not be impacted by utility systems, primarily because of their locations. Elements of one more important resource would be retained by BLM and would be protected. This situation would result in continued vulnerability for a few of the important affected resources of the resource area, but most of the important resources would be protected.

### Management Actions for Cultural/ Natural History Resources

This program is oriented towards cultural and natural history resource protection and all special management actions under this program would

enhance the protection of selected important cultural and natural history resources. The preferred alternative would cause beneficial impacts through several special management actions. Management plans would help protect several cultural resource properties through the well thought out management of those resources. The resources would be the Castle Gardens Rock Art site, Warm Spring Canyon, the Oregon/Mormon Trail corridor (including the trail-related sites of the Split Rock Landmark, Ice Spring Slough, Rocky Ridge, Gilesple Place/Radium Springs, Willies Handcart Commemorative site, Devil's Gate Landmark, Martins Cove, and Burnt Ranch (if acquired)), Beaver Rim proposed National Natural Landmark, Red Canyon National Natural Landmark, and South Pass proposed National Register Mining District (all important sites).

In addition to the above, some important cultural and natural history resources would not be given special management but would not be adversely affected. Due to each property's good integrity and protected location, these resources would not suffer from a lack of special cultural/natural history program management at this time. These properties are the Sparhawk Cabin and the Aspen Grove site.

The cumulative impacts of the preferred alternative's cultural/natural history management actions would generally be beneficial. Fourteen important cultural properties would be protected through enhanced management, and two more resources would remain protected despite the lack of enhanced management (see table 4-9).

## Environmental Consequences

**TABLE 4-9**  
**EFFECTS ON SIGNIFICANT CULTURAL/  
NATURAL HISTORY RESOURCES**  
**PREFERRED ALTERNATIVE**

Management Unit	Significant Resources	Management Actions	Resource Protected
Green Mountain	Sparhawk Cabin	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes (1) No Yes (1) Yes (2)
Beaver Creek	Oregon/Mormon Trail	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes No Yes (4)
	Oregon/Mormon Trail Sites —		
Beaver Creek	Split Rock Landmark	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes Yes (4)
Beaver Creek	Ice Springs Slough	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes No (3) Yes (4)
Beaver Creek	Rocky Ridge	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes Yes (4)
Beaver Creek	Gilesple Place/ Radium Springs	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes Yes (4)
Beaver Creek	Willies Handcart Site	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes Yes (4)
Beaver Creek	Beaver Rim Proposed NNL	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes No Yes
Beaver Creek	Burnt Ranch	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	N/A N/A N/A Yes (4)



## Environmental Consequences

**TABLE 4-9 (Continued)**  
**EFFECTS ON SIGNIFICANT CULTURAL/  
 NATURAL HISTORY RESOURCES**  
**PREFERRED ALTERNATIVE**

Management Unit	Significant Resources	Management Actions	Resource Protected
Beaver Creek	See Wilderness Supplement for site description)	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes Yes Yes
Red Canyon	Red Canyon NNL	Oil and Gas Locatable Minerals Phosphates Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes Yes Yes Yes
South Pass	South Pass Proposed National Register Mining District	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes Yes Yes
Gas Hills	Castle Gardens	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes Yes (1) Yes
Gas Hills	Oregon/Mormon Trail	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes Yes Yes (4)
Gas Hills	Oregon/Mormon Trail Sites - Devils Gate Landmark	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes Yes Yes (4)
Gas Hills	Martins Cove	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes Yes Yes Yes (4)
Dubois Area	Warm Spring Canyon Flume, Natural Bridge and Geyser	Oil and Gas Locatable Minerals Landownership Adjustments and Utility Systems Cultural/Natural History	Yes Yes No Yes Yes

(1) - Resource would be protected by standard protection measures.

(2) - Resource would not have special cultural/natural history program management, but would still be adequately managed.

(3) - Part of site would be protected, part would not be protected.

(4) - Managed according to the Oregon/Mormon Trail Management Plan recommendations.



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## CHAPTER V

### THE PREFERRED ALTERNATIVE

#### ALTERNATIVE FORMULATION AND THE PROCESS USED TO SELECT THE PREFERRED ALTERNATIVE/PREFERRED PLAN

Both the National Environmental Policy Act (NEPA) and the BLM resource management planning regulations require consideration of a range of alternatives. The basic goal in formulating RMP alternatives was to identify various combinations of public land uses and resource management practices that responded to the planning issues. The alternatives presented in this chapter represent combinations of actions to guide land-use activities and resource management in the Lander Resource Area.

There are four alternatives presented in this document. One alternative, Alternative A, is the no action alternative. This means there would be a continuation of present management. The other three alternatives provide a range of choices offering various options, ranging from an emphasis on resource conservation to an emphasis on production. The preferred alternative is a combination of elements of Alternatives A, B and C.

Alternative A, present management, served as the foundation for formulating other alternatives. During the development of the management situation analysis (see Chapter 1, Planning Process), all land-use plans for the Lander Resource Area were compiled into one alternative, Alternative A. The effects of Alternative A were then analyzed to determine if there were better options to the way the resource area was being managed. Through this analysis, it was shown that there were different options for different parts of the resource area.

Because of these differences, it was convenient to portray present management and the options to present management by geographic area or management unit. All together, 13 management units were identified, including the wilderness study areas (section III in this chapter lists the management units).

Once present management was portrayed by management unit and all the reasonable options to present management were developed for each management unit (see Appendix 1). Two additional alternative plans for the resource area (alternative B and C) were formulated. This resulted in the consideration of three alternative plans (A, B and C).

Alternatives A (no action, continuation of present management), B and C were analyzed first to identify any significant impacts they might cause and to determine how effective they might be at issue resolution. Following this analysis and the consideration of multiple-use tradeoffs, the preferred alternative or plan was selected by choosing among the various options within alternatives A, B and C. This preferred alternative was then analyzed to see if it would change any of the previously identified impacts. It did not. Following that analysis, a cumulative analysis was made to see if the cumulative impacts of the preferred alternative would be less than those caused by alternatives A, B or C (see Chapter IV).

#### OVERVIEW OF PREFERRED ALTERNATIVE

##### Energy and Minerals

###### Oil and Gas

The overall theme for management of the oil and gas resources within the resource area is to make public lands available for leasing to the maximum extent possible, while giving due consideration to the protection of other significant resource values. The potential for the occurrence of oil and gas and the significance and sensitivity of other resource values present in the resource area were used as management tools to aid in the determination of detailed management prescriptions for each management unit.

All of the slightly more than 2.7 million acres of federal mineral estate within the resource area would be open to leasing (see map 5-1). All but approximately 12,000 acres of the open acreage



- Open, No Surface Occupancy
- Open with Standard Requirements

Map 5-1  
Oil and Gas Leasing Decisions  
Lander Resource Area



## Preferred Alternative/Plan

would be managed under a management prescription that would allow for enhanced management of the oil and gas resources by being less restrictive of oil and gas development related to other surface resource values in areas rated as having a high potential for the occurrence of oil and gas. In addition, as new information on the potential occurrence of oil and gas in any given area is obtained or new discoveries of oil and gas reserves are made, the potential rating for the area would be revised to reflect the new data.

Oil and gas leases issued within the resource area would be conditioned with stipulations to protect other important resource values. These restrictions (see Appendix 2) would provide needed protection to other resources and at the same time allow for as much opportunity as possible to explore for and develop the oil and gas reserves within the resource area.

Geophysical activities associated with oil and gas exploration would generally be restricted in the same manner as other oil and gas exploration and development activities. Geophysical activities don't necessarily have the same impacts on surface resources as do other oil and gas exploration activities, but because of the wide variety of methods and the even wider variety of impacts associated with them, it would be impossible to predict all possible combinations of methods and resources potentially impacted and to develop a management prescription that would be detailed enough to cover all possibilities. If a particular method of geophysical exploration could be conducted within the constraints necessary to protect other resources, it would be allowed.

### Locatable Minerals

All federal lands within the resource area would be open to locatable mineral exploration and development unless specifically withdrawn or segregated from appropriation under the mining laws (see map 5-2). At the present time, approximately 1 percent of the federal mineral estate within the resource area is closed to locatable mineral exploration and development. Under the preferred management alternative, that portion of the resource area that would be closed to locatable mineral exploration and development would increase by 30,000 acres to approximately 2 percent of the total federal mineral estate within the resource area. The additional acreage proposed for withdrawal would be withdrawn to

protect crucial wildlife habitat in the East Fork Elk Winter Range and Whiskey Mountain Bighorn Sheep Winter Range, and the remaining acreage would be scattered throughout the resource area in small tracts primarily for the protection of significant cultural and historical resources.

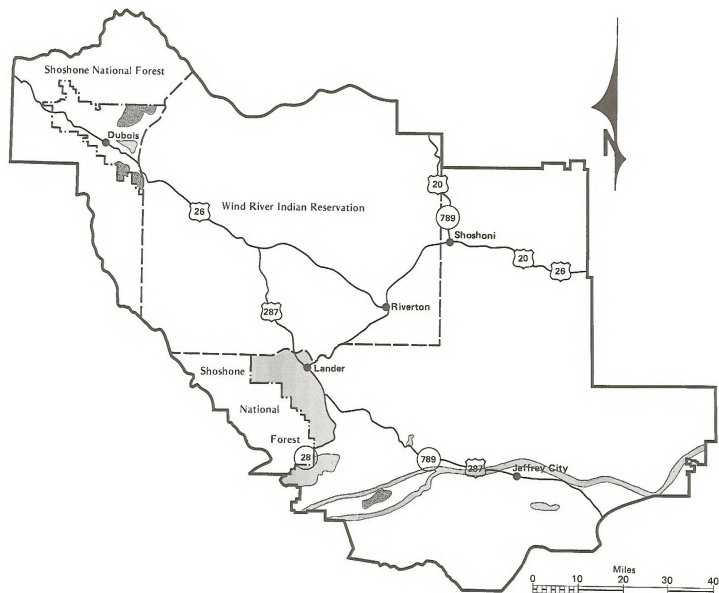
In addition, in an attempt to minimize the acreage withdrawn to protect significant surface values, the preferred alternative would require that plans of operations be approved for all exploration and mining operations (except for casual use) in certain areas that might otherwise be withdrawn, and that notices of intent for operations of 5 acres or less would not be allowed. This would provide for a higher degree of protection for significant surface values, while still providing maximum opportunity to explore and develop the locatable mineral resources within the resource area.

### Phosphates

The preferred management plan for the resource area would allow prospecting, exploration and development, and leasing of phosphate reserves. The phosphate reserves are located in a belt running along the northeast flank of the Wind River Range and extend into three different management units. Phosphate activities within the Red Canyon and Lander Slope Management units would require stringent stipulations and mitigation measures to protect significant surface resource values. The Beaver Creek Management Unit, which contains approximately one-half of the known phosphate reserves, would remain open to exploration, development and leasing with fewer restrictions than would be the case in the Red Canyon and Lander Slope Management units. In the Red Canyon and Lander Slope Management units, these restrictions would adversely affect the economic recovery of the phosphate resource (see Appendix 2 for applicable restrictive measures).

### Other Minerals

The preferred management plan for the resource area would provide for the exploration and development of other minerals such as sand and gravel, building stone, and other common variety mineral materials on a demand basis and consistent with the limitations and restrictions imposed on oil and gas, locatable minerals, and phosphate exploration and development within the resource area.



- Withdrawn (existing & proposed)
- Open, Plans of Operations Required Except Casual Use
- Open with Standard Requirements

Map 5-2  
Locatable Minerals  
Lander Resource Area

### Fish and Wildlife

General emphasis in management actions for the fish and wildlife program within the resource area has been established by the preferred alternative selected for each management unit. Based on these selections, the following management direction is indicated.

Improvement of aquatic and riparian habitats for fish, beaver, moose, and many other animals would receive top priority in the South Pass and Beaver Creek Management units, high priority in the Green Mountain Management Unit, and special attention in the Red Canyon Management Unit. Aquatic/riparian habitat management plans would be developed for an area encompassing parts of the upper Sweetwater River and Beaver Creek drainages and for the Green Mountain area.

Improvement of important big game ranges would receive high priority. The use of prescribed burning, cutting, thinning, planting, seeding, pitting, herbicide treatment, or other appropriate methods would be employed. Priority areas for action would be the Red Canyon and Lander Slope units for elk and other big game habitat, the Whiskey Mountain unit for bighorn sheep, the southwest part of the Beaver Creek unit and the South Pass unit for moose and mule deer, the Green Mountain unit for elk and mule deer, and the Sweetwater Rocks portion of the Gas Hills unit for mule deer. Terrestrial habitat management plans would be developed for the Red Canyon and Lander Slope units, the Sweetwater Rocks, and the south-central part of the Beaver Creek unit.

BLM would continue to work closely with the Wyoming Game and Fish Department (WGFD) in all matters affecting fish and wildlife resources. Habitat management plans would be developed in cooperation with WGFD. BLM would continue to uphold its commitments made through cooperative agreements, cooperative management plans and memoranda of understanding such as those long-standing agreements concerning the Red Canyon and East Fork Big Game Winter Range and the Whiskey Mountain Bighorn Sheep Winter Range.

Objectives for some wildlife habitat management actions would be incorporated into other activity plans such as timber management, allotment management, allotment development,

or cooperative management. This would occur where limited or specialized fish or wildlife objectives could be accomplished through guidance provided by these plans without developing a full-scale, overlapping habitat management plan.

Development of small scale, simple or routine habitat improvement projects and maintenance of useful existing projects would be continued throughout the resource area. Such actions would be subject to normal interdisciplinary environmental review, and budgetary and management constraints.

### Forest Management

Most of the timber management in the resource area would occur in the Green Mountain Management Unit (see map 5-3). Small volumes may be offered from South Pass and Dubois units and larger volumes from the Lander Slope unit.

Minor forest products (fuelwood, post and poles, houselogs, etc.) would continue to be sold from timbered areas on a demand basis, depending on resource management objectives. Most fuelwood cutting would occur in the Green Mountain Management Unit.

Sawtimber volumes offered would be approximately 2 million board feet per year and minor forest product volumes would be 1.5 to 2 million board feet. The primary objective of the harvesting program would be to achieve management of the timber resources by salvaging the dead and dying timber and regenerating the harvested areas. However, other resource objectives, such as wildlife, would be integrated into management plans to enhance these other values.

Prescribed burning techniques would be included in management plans for conifer and aspen stands to achieve multiple resource objectives. Standard and special provisions would be employed on all sales and burns to achieve management objectives. Clearcuts, in all cases, would be limited to 25 acres and the size of prescribed burns would be determined on an individual project basis. Regeneration of all harvested and burned areas would be assured, either through natural or artificial regeneration.

Forest-cultural practices in timber stands would be undertaken as needed, depending on funding, to assure optimum growth conditions in all stands.



Map 5-3  
Forest Management  
Lander Resource Area

### Landownership Adjustments and Utility Systems

The preferred alternative is to retain the majority of the 2.5 million acres of public lands in federal ownership. One hundred seventy-two tracts, encompassing approximately 24,500 acres, meet the basic criteria for disposal pursuant to the Federal Land Policy and Management Act of 1976. Following more detailed analysis, it appears that 108 of these tracts, encompassing 13,000 acres, could be considered for future disposal through either sale or exchange (see map 5-4). The other 64, encompassing approximately 11,500 acres, would be retained in public ownership.

Proposals for disposal or exchange received in the future would be considered on a case-by-case basis. If a certain proposal is determined to be consistent with the objectives of this RMP, it could be approved without preparing a planning amendment.

Leases and disposals under the Recreation and Public Purposes Act would continue to be used to meet the needs of local and state governments.

Major utility and transportation systems would be located to make use of existing corridors whenever possible, to provide for cost-efficient routes, and to provide for protection of other resource values such as scenery and wildlife. Most of the area would be open for location of major utility systems. However, areas with the most potential conflicts have already been identified as areas to avoid. The avoidance areas would be areas where rights-of-way may be granted only when no feasible alternative route or designated rights-of-way corridor is available. These areas include the Whiskey Mountain Bighorn Sheep Winter Range, the East Fork Crucial Elk Winter Range, the Dubois Badlands, the Lander Slope, Red Canyon, South Pass, Sweetwater Canyon, the Sweetwater Rocks, and ¼ mile or the visible horizon, whichever is less, on each side of the Oregon/Mormon National Historic trails (see map 5-5).

### Recreation Management

The preferred alternative provides for management and maintenance of seven existing recreational sites, including Atlantic City, Big Atlantic Gulch and Cottonwood campgrounds; Split Rock and Devil's Gate interpretive sites; and

Wild Horse Point Overlook and Castle Gardens picnic areas. The Split Rock and Devil's Gate interpretive sites are included in the Oregon/Mormon Pioneer National Historic Recreation Area Management Plan.

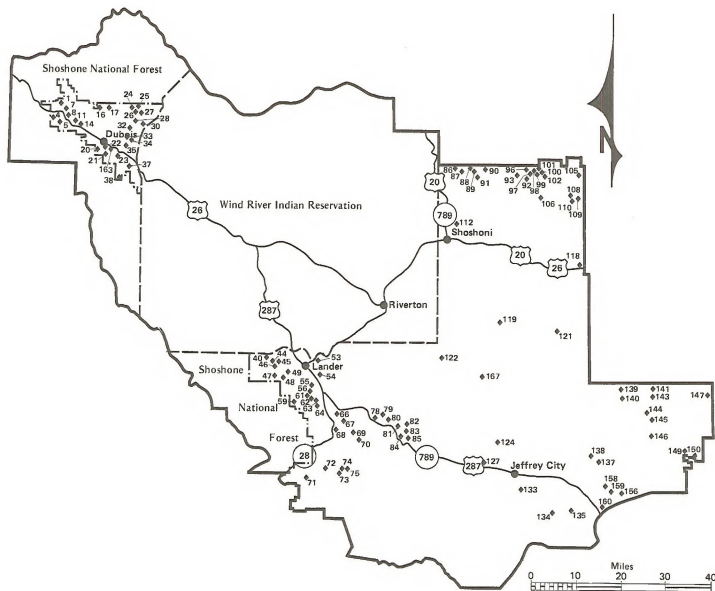
An interpretive marker would be added for the Red Canyon National Natural Landmark overlook. Hazard reductions would be implemented and maintained on Green Mountain and South Pass. Plans for resource protection and maintenance of dispersed recreational opportunities and settings in the South Pass Historic Mining Area would be provided in a recreation management plan.

The Lander Resource Area staff would continue to monitor recreational use throughout the resource area. Area personnel would supervise recreational use and provide enforcement of recreation-oriented regulations and special designations. Monitoring and use supervision would be accomplished by patrolling high-use areas and contacting users in the field. Special efforts would be made to ensure compliance with the terms of special recreation use permits, authorizing commercial guide/outfitter services, permits for tours of the Oregon/Mormon Pioneer National Historic trails, and special designations dealing with recreation such as a 14-day camping limit on public lands and off-road vehicle designations. Quotas would be established for commercial hunting camps in the Green Mountain, Lander Slope, Red Canyon, and Whiskey Mountain Management units.

Winter sports would be restricted in the Red Canyon elk winter range area.

### Off-Road Vehicles (ORVs)

The preferred alternative for ORV management would provide for the continuation of existing ORV designations completed in 1981 on about one-half of the resource area. It would also provide for designations to be completed on the remaining areas of public lands. ORV management would focus more intensive management on those management units having crucial wildlife values, significant visual resources, high watershed sensitivity and outstanding natural character. Intensive management would limit ORV use to designated roads and vehicle routes and impose seasonal closures (from approximately December through June) on areas or roads where vehicle use is totally incompatible with other resource values. ORV use in the remainder of the resource



Map 5-4  
Potential Sale Or Exchange Tracts  
Lander Resource Area





- Open Areas
- Avoidance Areas

Map 5-5  
Major Utility Systems  
Lander Resource Area

## Preferred Alternative/Plan

area would be limited to existing roads and vehicle routes, except for the performance of necessary tasks (i.e., work requiring the use of a motor vehicle. Examples include picking up big game kills, repairing range improvements, managing livestock, mineral activities where surface disturbance does not total more than 5 acres as described in the "5-acre exemption" under the 43 CFR 3809 regulations, etc.). ORV designations are summarized in table 5-1 (see map 5-6).

## Cultural/Natural History

The various management actions chosen from the alternatives to make up the preferred alternative are generally oriented toward protection and maintenance of the significant cultural resources located in the Lander Resource Area.

The significant resources listed in several management units, including the Oregon/Mormon Trail; the South Pass Historic mining

TABLE 5-1  
OFF-ROAD VEHICLE DESIGNATIONS

Designation	Area	Approximate Acreage
Limited to designated roads and vehicle routes	Lander Slope/ Red Canyon	40,000 acres
Limited to designated roads and vehicle routes	Green Mountain	56,000 acres
Limited to designated roads and vehicle routes	Whiskey Mountain	4,500 acres
Closed	Castle Gardens	80 acres
Closed	Dubois Badlands	4,500 acres
Limited to existing roads and vehicle routes	All other public land in Lander Resource Area	2,400,000 acres

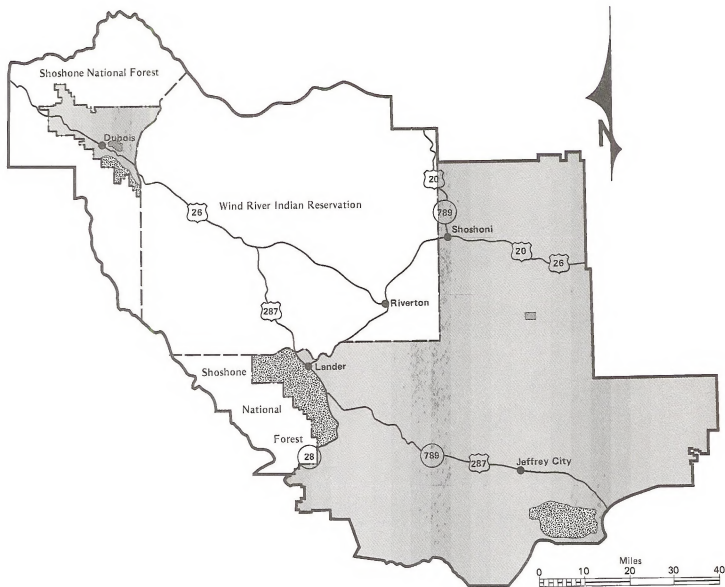
area; Castle Gardens; the Red Canyon National Natural Landmark; and the Warm Springs Canyon flume, natural bridge and geyser, have been selected for enhanced protection. The significant resources listed in the remaining management units, including the Sparhawk Cabin site, need no further management at this time; therefore, no special management actions have been proposed.

## Fire Management

The preferred alternative for approximately 2 percent of BLM administered lands is full suppression, with no equipment restrictions (see map 5-7). This would have the objective of suppressing all wildfires as quickly as possible with all available resources.

The areas for full suppression are areas with large amounts of intermingled or adjacent private and state lands and they contain either high historical or man-made values or very high wildlife habitat values. The values that could potentially be destroyed by uncontrolled wildfire far outweigh the damages that could occur from fire-fighting activities. For these reasons, wildfires in these areas should be suppressed as quickly as possible.

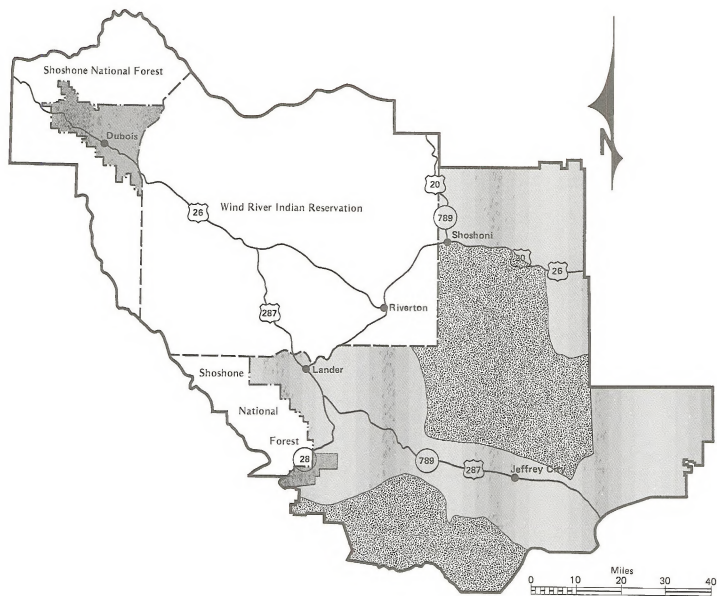
The preferred alternative for approximately 60 percent of the lands is full suppression of wildfires with limited or restricted use of heavy equipment. This does not preclude the use of heavy equipment, such as bulldozers, but does limit their use on initial attack and requires fire authorities to analyze a fire situation critically before committing heavy equipment to a fire.






- Existing Roads and Trails
- Designated Roads and Trails  
(Green Mountain, Lander Slope, Whiskey Mountain)
- Closed ( Castle Gardens; Dubois Badlands)

Note: Red Canyon Elk Winter Range is closed to over Snow Vehicles.

Map 5-6  
ORV Designations  
Lander Resource Area



-  Full suppression with no restrictions; prescribed burns allowed.
-  Full suppression with no heavy equipment on initial attack; prescribed burns allowed.
-  Limited suppression; prescribed burns allowed.

Map 5-7  
Fire Management Plan  
Lander Resource Area

## Preferred Alternative/Plan

This alternative was chosen for some of the more critical areas in terms of resources such as visual, wildlife habitat, soils, timber, and recreation. There are many man-made improvements in these areas and large areas of intermingled private and state lands. Because these improvements and other lands could be severely damaged by uncontrolled fires, fires should be suppressed as quickly as possible. However, the inherent values in the area could be damaged beyond immediate repair through the uncontrolled use of heavy ground equipment in the fire-fighting operations; therefore, limitations would be put on the use of heavy equipment.

The preferred alternative for approximately 38 percent of the public lands in the resource area is limited suppression of wildfires. Under this alternative there would be no initial attack on the fire and an observer would monitor a wildfire to ensure management objectives were being met. Suppression of a wildfire would occur when the fire 1) exceeds or has the potential to exceed the size specified in a predetermined plan, 2) threatens private property, 3) threatens other man-made structures, or 4) threatens human life.

The areas chosen for this alternative are generally more remote areas with few man-made improvements and small amounts of intermingled private and state lands. Wildfires would have little

potential for damaging improvements or other lands; therefore, the cost of suppression activities cannot be justified.

## Access

The preferred alternative, which balances access needs with existing access, provides the most realistic overall transportation plan. Under this alternative, unneeded access roads would be rehabilitated, as outlined in the plan and funded by the benefitting activity. BLM access easement negotiations with landowners would be proposed for areas where public or administrative access would be needed. Current and proposed BLM road easements are delineated on table 5-2 and map 5-8.

## Soil, Water and Air Management

Soil, water and air management were not considered as separate resource programs or issues in the alternatives and analyses, but were considered in each of the resource programs analyzed to assure management actions meet

TABLE 5-2  
ACCESS

Existing Easements		Easements Proposed for Negotiation	
Maintenance Standard*	Road Name	Maintenance Standard*	Road Name
4	Ft. Stambaugh Loop	1	East Beaver Creek 2401
2	Hudson-Atlantic City 2302	3	Crooks Mountain 2409
2	Three Forks-Atlantic City 2317	1	Mormon Basin 2202
3	Green Mountain Loop 2411	1	Government Draw 2304
2	Cedar Rim 2301	2	Signor Ridge
2	Agate Flats 2404	4	Taggart Meadows
2	Castle Gardens 2107	2	Hudson Atlantic City 2302
2	Cyclone Rim 3216	2	Copper Mountain 2113
1	Red Creek 3219	2	Willow Creek 2412
2	Bison Basin-Hadsell Crossing	1	Beef Gap
2	Copper Mountain 2113	1	Wolf Gap
1	Oil Springs 2305	2	East Beaver
		1	Tappan Creek
		1	Dilebaugh Butte 2315

\*Maintenance standards are based on need and are:

- 1 = primitive road, minimal intermittent maintenance.
- 2 = single land bladed, intermittent regular maintenance.
- 3 = graded, double lane ditched, regular maintenance.
- 4 = graded, double lane ditched, regular maintenance, graveled.



Existing Access Easements

- A Fort Stambaugh Loop 2324
- B Hudson-Atlantic City 2302
- C Three Forks-Atlantic City 2317
- D Green Mountain Loop 2411
- E Cedar Rim 2301
- F Agate Flats 2404
- G Castle Gardens 2107
- H Cyclone Ridge 3216
- I Red Creek 3219
- J Bison Basin-Hadsell Crossing 3221
- K Copper Mountain 2113
- L Oil Springs 2305

Proposed Access Easement Negotiations

- 1 Beaver Rim 2401
- 2 Crooks Mountain 2409
- 3 Mormon Basin 2202
- 4 Government Draw 2304
- 5 Signor Ridge
- 6 Taggart Meadows
- 7 Hudson-Atlantic City 2302
- 8 Copper Mountain 2113
- 9 Willow Creek 2412
- 10 Beef Gap
- 11 Wolf Gap
- 12 East Beaver
- 13 Tappan Creek
- 14 Dillabaugh Butte 2315

Map 5-8  
Access  
Lander Resource Area



## Preferred Alternative/Plan

basic objectives. The objective is to manage the public lands in a manner that will protect and improve the quality of the soil, water and air resources associated with the public lands.

### Livestock Grazing

Grazing allotments have been grouped into three categories: M (maintain), C (custodial) and I (improve). For each category, recommendations are made for an intensity of grazing management, including specific multiple-use resource management objectives, range improvement and monitoring needs, and actions needed to improve and maintain rangeland condition and productivity (see Livestock Grazing Supplement). Under the preferred alternative, present management would continue until monitoring results were available. Management actions based on all available data would then be implemented on the allotments, beginning with those needing the most improvement.

There are 291 allotments in the Lander Resource Area. Category M allotments comprise 19 percent of the allotments and 27 percent of the acreage in the resource area. The principal objective for these allotments is to maintain or improve their present satisfactory resource condition and allotment management. Category C allotments comprise 28 percent of the allotments and 4 percent of the acreage in the resource area. The principal short-term objective on these allotments is to prevent deterioration of the current resource conditions by managing the lands in a custodial manner. Category I allotments comprise 43 percent of the allotments and 69 percent of the acreage in the resource area. The principal objective for management of Category I allotments is to improve existing resource conditions and reduce or eliminate conflicts. Specific management actions proposed for these allotments depend upon the specific problems affecting each allotment (refer to Grazing EIS Supplement and Green Mountain EIS).

### Green Mountain EIS Area

In the rangeland management section of the Green Mountain Management Framework Plan, the grazing allotments were grouped into categories, and for each category recommendations were made for an intensity of grazing management, including: specific multiple-use

resource management objectives; range improvement and monitoring needs; and actions needed to improve and maintain rangeland condition and productivity. Tradeoffs considered in arriving at the recommendations were identified in the analysis found in the MFP. Under the proposed action, present management continued until monitoring results were available. Management actions based on all available data would then be implemented.

Category M allotments comprise 20 percent of the allotments and 6 percent of the acreage in the EIS area. The principal objective for these allotments is to maintain or improve their presently satisfactory resource condition and allotment management. Category C allotments comprise 26 percent of the allotments and 1 percent of the acreage in the EIS area. The principal short-term objective on these allotments is to prevent deterioration of the current resource conditions by managing the lands in a custodial manner. Category I allotments comprise 54 percent of the allotments and 93 percent of the acreage in the EIS area. The principal objective for management of category I allotments is to improve existing resource conditions and reduce or eliminate conflicts. Specific management actions proposed for these allotments depend on the specific problems affecting each allotment.

Under the elimination of livestock grazing alternative, livestock grazing would be eliminated from the public lands in the Green Mountain EIS area, and the lands would be managed for other resource values. Wild horse populations would be allowed to increase, and all managed wildlife species would be allowed to increase to population levels identified in the Wyoming Game and Fish Department's Strategic Plan for Comprehensive Management of Wildlife in Wyoming.

Under the enhanced livestock grazing alternative, forage available for domestic livestock use would be increased through an accelerated program of range improvements. Suitable allotments would be placed under allotment management plans (AMPs), and livestock would have priority in forage allowances.

Under the no action alternative, the existing range management program would be frozen. There would be no new range improvement projects, but maintenance of existing improvements would be allowed. Livestock management actions such as changes in seasons-of-use, class of livestock, etc., would not be allowed, regardless of need. Wild horse and wildlife numbers would be maintained at current levels through wild horse

## Preferred Alternative/Plan

gathering operations and coordination with the Wyoming Game and Fish Department.

Under the management based on currently available forage data alternative, currently available forage data would be used, in lieu of monitoring, to establish grazing capacities. Maintenance and construction of range improvements would continue as planned. Plans for livestock and wild horse adjustments would begin immediately. Other management actions would be the same as for the Proposed Action.

The Proposed Action is the preferred alternative. The proposed rangeland management for the EIS area was formulated through the BLM planning system, specifically the Green Mountain MFP. Resource problems and possible solutions were identified and analyzed to determine effects on other resources. The resulting multiple-use MFP recommendations were the basis for the proposed action (refer to Green Mountain Grazing EIS).

### Gas Hills EIS Area

The preferred alternative was selected over the other alternatives (described in the Gas Hills Grazing EIS Supplement) because it includes the management actions and rangeland improvements needed to improve conditions in those allotments where there is a need and potential for improvement. It also provides for maintenance of present satisfactory conditions and management in the other allotments.

Specifically, it was selected over the continuation of present management alternatives because present management does not address the monitoring and management needs for those allotments where improvement is necessary.

### Wilderness

Three management units in the Lander Resource Area are wilderness study areas (WSAs). These units, which encompass 6 WSAs totalling 48,000 acres, are Sweetwater Canyon, Sweetwater Rocks (4 units), and Copper Mountain (see map 5-9). Please refer to the Wilderness EIS Supplement for the detailed description and analysis.

The Sweetwater Canyon Wilderness Study Area is located south of Lander in the southwest portion of the resource area. The preferred alternative for Sweetwater Canyon is partial wilderness.

The Sweetwater Rocks Wilderness Study Areas are four separate units located east of Jeffrey City in the southeastern portion of the resource area. The preferred alternative for all four units is continuation of present multiple-use management.

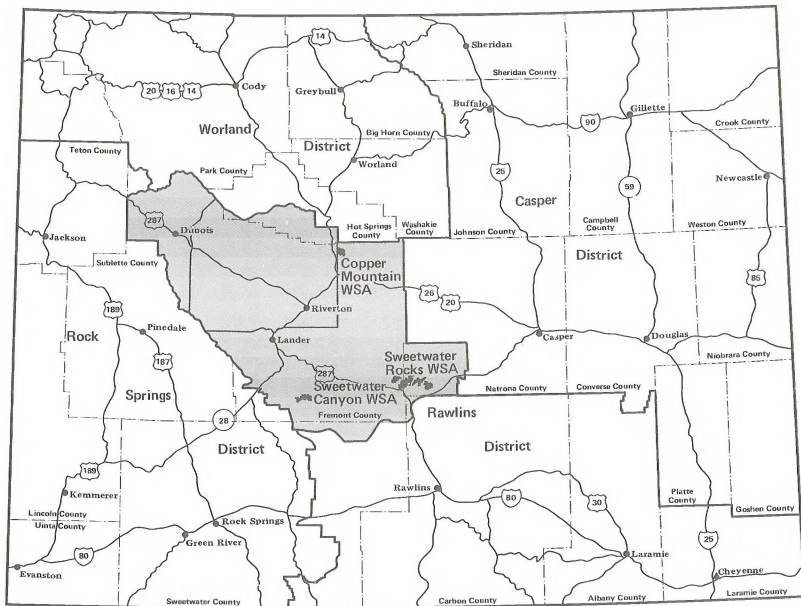
The Copper Mountain Wilderness Study Area is located in the north-central portion of the resource area and north of the town of Shoshoni. The preferred alternative is continuation of present multiple-use management.

### Areas of Critical Environmental Concern

To protect significant surface values such as scenic areas, cultural resources and significant wildlife habitats, the preferred alternative would require intensive management of all surface disturbing activities in the following areas: the protective corridor for the Oregon/Mormon Pioneer Trail and specific sites along the trail, and the South Pass, Red Canyon, Lander Slope and the Dubois Badlands Management units.

Because unrestricted surface disturbing activities like mineral exploration and development could cause significant impacts to the unique values present in these areas, the preferred alternative would designate these areas as ACECs.

BLM has the authority to manage almost all surface disturbing activities to prevent significant impacts to other resources without specifically designating an area as an Area of Critical Environmental Concern (ACEC). However, locatable mineral activities, such as uranium exploration and development disturbing 5 acres or less are an exception. Therefore, in order to implement the preferred alternative, the areas listed above would have to be designated as ACECs.



Map 5-9  
General Location-Wilderness Study Areas  
Lander Resource Area

## THE PREFERRED ALTERNATIVE AND RATIONALE BY MANAGEMENT UNIT

### Introduction and Background

Early in the process, guidance was established to provide for identification of resource management units and management actions for each unit (see Appendix 1 for maps of each management unit). The Lander Resource Area has 13 such units that were delineated based on resource values, competing land uses, and areas that provide specific opportunities and needs for management actions (see map 1-1). Alternatives were then formulated to resolve these issues and management needs for each unit. The 13 management Green Mountain, Beaver Creek, Lander Slope, Red Canyon, South Pass, Gas Hills, East Fork, Dubois Badlands, Whiskey Mountain, Dubois Area, Sweetwater Canyon (WSA), Sweetwater Rocks (WSA), and Copper Mountain (WSA)

Please note that the planned management actions for each of the 13 areas will focus mainly on the resource values present and the preferred alternative for each resource program in that unit.

The planned management actions define the types of land use that would occur in each management unit as a result of the preferred management plan. Where dominant resource values are not present, the prescription will focus on major or priority management actions that would be carried out to improve, sustain or protect resources in the unit. This process affords detailed direction to specific geographic units and provides a clear picture of what resource values and BLM program actions would be initiated to manage resources over a 10-year period. It will also serve as an important budgeting tool, because work force requirements and materials can be budgeted systematically to carry out planned actions.

### Green Mountain Management Unit

The Green Mountain Management Unit contains about 126,000 acres of BLM-administered surface, 149,000 acres of federal mineral estate, and 36,000 acres of state and private lands.

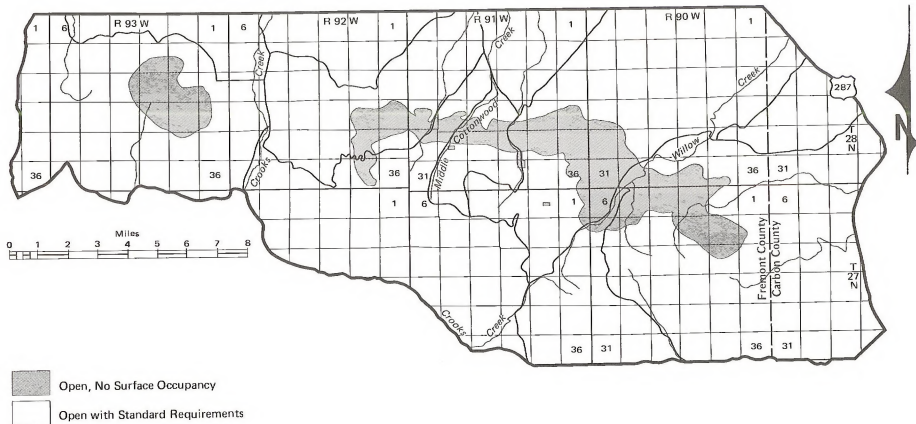
The Green Mountain area encompasses some of the most diverse and intensive uses of resources within the resource area. It is the site of extensive uranium exploration, mining, oil and gas activity, and contains substantial commercial-grade timber stands that are being harvested. It also contains important wildlife habitat values. Green Mountain is a popular and well-used recreational area enjoyed by hunters, anglers, off-road vehicle enthusiasts, snowmobilers, campers, hikers, and other outdoorsmen. It is also used by livestock operators for cattle grazing, and it is part of the area used as range by wild horses.

### Energy and Minerals

#### Oil and Gas

The preferred alternative for management of the Green Mountain Management Unit would include keeping the entire unit open for oil and gas leasing with some no-surface occupancy restrictions (see map 5-10). New oil and gas leases issued in areas rated as having moderate, low or no potential for the occurrence of oil and gas reserves would include a no-surface occupancy restriction to protect water quality, fisheries, riparian areas, sage grouse leks, steep slopes, threatened and endangered species, significant cultural sites, elk crucial winter range, and the campground and picnic site on Green Mountain. In addition, seasonal restrictions would be applied to the leases to protect crucial wildlife habitat areas. In areas with moderate, low or no potential for occurrence of oil or gas, restrictions would be applied automatically prior to lease issuance. These restrictions could be waived later if appropriate. In areas with high-potential for the occurrence of oil or gas including KGSSs, restrictions would not be automatically applied prior to lease issuances. Instead, new oil and gas leases in these areas would be conditioned with no-surface occupancy and seasonal restrictions only when necessary to avoid a significant adverse impact on another resource. This alternative would further provide for the enhancement of oil and gas development in KGSSs and high-potential areas through the waiver of lease restrictions on demonstration by the lessee that adverse impacts to other resources could be acceptably mitigated.

Implementation of the preferred alternative would allow for maximum management flexibility over the full range of resources. In areas of moderate, low and no potential for occurrence of oil and gas, this alternative allows for enhanced management of the surface resources, while providing opportunities for exploration and



Map 5-10  
Oil and Gas Leasing Decisions  
Green Mountain



## Preferred Alternative/Plan

development of the oil and gas reserves. Conversely, in areas of high potential for the occurrence of oil and gas or in areas of established production such as KGSs, this alternative allows for enhanced management of exploration and development activities by minimizing the restrictions imposed on these activities.

### Locatable Minerals

The Green Mountain Management Unit would be open for locatable mineral exploration and development, except for 120 acres around the BLM and county campgrounds and picnic sites on Green Mountain, which are presently segregated from appropriation under the mining laws. In addition, a plan of operations would be required for all locatable mineral exploration and development activity within 350 feet of the Sparhawk Cabin and on crucial elk winter range (see map 5-11).

The preferred alternative maintains opportunities for the exploration and development of locatable mineral resources. It restricts locatable mineral exploration and development on only a few sites where these activities could cause unacceptably high adverse impacts to other significant resource values.

### Fish and Wildlife

Under the preferred alternative, routine fish and wildlife habitat improvement projects and maintenance of existing projects would be completed after appropriate review and would be consistent with program capabilities and priorities. Prescribed burns and other cultural practices would be used to manipulate selected tree and shrub sites to improve habitat for elk, mule deer, beaver, fisheries, and a variety of other animal species. The Green Mountain Management Unit would be a moderate priority area for development of an aquatic habitat management plan for improvement of fisheries and riparian and beaver habitats. Major habitat improvement objectives for elk and mule deer would be incorporated into a comprehensive timber management plan and grazing allotment management or development plan.

This alternative was selected because it would provide reasonable ways to maintain and enhance the significant fish and wildlife resource values in the unit, based on the need to upgrade management of the timber resource and allow for continued development of the high-value uranium and oil and gas resources.

Cultural practices designed to promote aspen and willow regeneration and create diversity in size, age-class, and edge-effect in conifer stands, while still maintaining elk cover requirements, would improve habitat for elk and mule deer. Improving the vigor of aspen and willow stands, expanding the size of stands or reestablishing stands would help stabilize the forage and material base to maintain beaver and their dam complexes. This, in turn, would benefit many other wildlife species by helping to raise water tables, stabilize stream flows and stabilize or expand riparian zones.

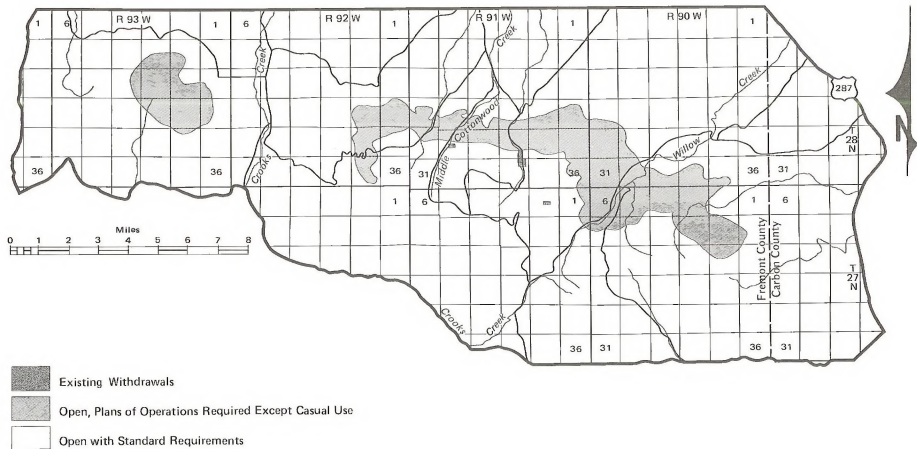
### Forest Management

The preferred alternative for forest management in the Green Mountain Management Unit involves advertised or negotiated timber sales totalling approximately 2 MMBF (million board feet) per year to meet the demand for sawtimber products. Also, approximately 1.5 to 2.0 MMBF would be sold on a public demand basis to meet the demand for minor forest products (fuelwood, posts and poles and houselogs).

The entire mountain would be managed on a compartment basis, whereby the timber sales would be harvested from specific compartments on a rotation basis. The mountain has been divided into 17 compartments. Management activities would be conducted for 5 or 6 years in each compartment, and the operations would then be moved to the next compartment. After the sales have been terminated, efforts would be made to concentrate the majority of the public woodcutting in the compartments in which the advertised sales were being conducted. Also, prescribed burns or other techniques would be applied to areas within each compartment, either at the same time sales were being conducted or immediately after sales have been terminated. The plan is to complete all management actions in every compartment within 110 years.

The management actions in adjacent compartments would be separated in time so that the forest would eventually progress to an uneven-aged condition. This would enhance the wildlife habitat by maintaining a continual supply of forage and also a continual supply of thermal and hiding cover for big-game animals. This would also enhance the timber condition by removing the dead and dying mature and overmature stands and replacing them with vigorous new stands. The harvested stands would be separated enough so that the new stands, when mature, would make





## Preferred Alternative/Plan

the forest less susceptible to another mountain pine beetle epidemic similar to the one that has recently occurred.

Most harvesting would utilize clearcuts up to 25 acres in size, which would be irregularly shaped to create more edge effect for wildlife and to enhance natural regeneration of harvested areas. Clearcuts would not be allowed within 100 feet of perennial streams to reduce disturbances to riparian habitats. To reduce erosion potential, no harvesting with conventional logging equipment (bulldozers or rubber-tired skidders) would be allowed on slopes over 45 percent.

If any harvesting in aspen stands were conducted, clearcut sizes would be determined on an individual project basis.

Harvested sites would be prepared for regeneration by piling and burning all unuseable wood and debris left after logging (slash). Natural regeneration has been very successful in the past. However, if it were unsuccessful in some areas, artificial regeneration (planting or direct seeding) would be employed.

Precommercial or commercial thinnings in younger stands would be employed as required.

### Landownership Adjustments and Utility Systems

The preferred alternative is to consider two isolated tracts (134 and 135) totaling 166 acres for disposal through sale or exchange (see map 5-12). The rationale is that these parcels do not have legal public access and do not contain any known significant or unique resource values.

Proposals for disposal or exchange received in the future would be considered on a case-by-case basis. If a certain proposal is determined to be consistent with the objectives of this RMP, it could be approved without preparing a planning amendment.

Recreation and Public Purpose (R&PP) Act leases and patents would be allowed on a case-by-case basis. R&PP proposals would be analyzed to determine compatibility with the unit's resource values as applications were received from organizations and state and local governments.

Public lands would be open for location of utility and transportation systems. These systems would be concentrated in existing utility corridors whenever possible. No significant impacts are anticipated from major utility systems, especially if located in existing corridors.

### Recreation Management

The preferred alternative would maintain existing developments, establish a 14-day camping limit on all camping, eliminate safety hazards and improve aesthetic values. Quotas would be established for commercial hunting camps.

Generally, this unit would be managed as an extensive recreation management area where dispersed recreation would be encouraged and where visitors would have freedom of recreational choice with minimal regulatory constraint. Recreation management would emphasize the resolution of competing uses and provide resource protection. Thus, recreation management priorities include maintaining existing investments, reducing public safety hazards, enhancing aesthetic values, and establishing camping and commercial use quotas.

### Off-Road Vehicles (ORVs)

The preferred alternative would continue the present ORV designations that limit ORV use to designated roads and vehicle routes and establish seasonal road closures on Green Mountain above 7,000 feet elevation. Long- and short-term resource damage, user access requirements, and public safety suggest that limitation of ORV use is in the best public interest. Several roads and vehicle routes would be closed seasonally in order to protect the roadbed and surrounding watershed values (December 1 through June 15).

### Fire Management

The preferred alternative, full suppression with limited or restricted use of heavy equipment, was chosen for this area. This would entail an aggressive initial attack with all available resources, with the exception of heavy equipment such as bulldozers. The objective would be to suppress wildfires as quickly as possible with as little surface disturbance as possible.

The Green Mountain Management Unit has a very high fire danger because of the recent mountain pine beetle epidemic, which killed the majority of the larger trees. The area has a history of two lightning fires every year, and there are many man-made structures on the mountain, such as telephone and television relay stations, and exploratory drilling rigs during the summer and



Map 5-12  
Landownership Adjustments  
Green Mountain

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fall. There is also a very high use of the area for woodcutting and general recreation.

Wildfires probably could not be managed or controlled on Green Mountain and might cause more harm than good. However, fires in the area could play a very beneficial role in wildlife habitat and timber stand enhancement. It would be much safer, though, and objectives could be more fully met, by utilizing prescribed burns.

Because of the potential erosion problems on steep slopes, heavy equipment should be limited and used only when absolutely necessary. Uncontrolled use of heavy equipment during a previous fire on the Green Mountain Management Unit resulted in surface disturbance.

### Access

The preferred alternative would provide public access to public lands for forest, wildlife, recreation and livestock grazing management. Existing BLM roads and easements would be maintained, and BLM would negotiate additional easements as identified in the District Transportation Plan. As of 1985, the plan calls for negotiating easements on the Willow Creek Road (via the Cooper Creek Road), the Crooks Mountain Road and the Taggart Meadows Road.

Unnecessary roads, such as the Cooper Creek fire access road, would be obliterated and rehabilitated, thus restoring the natural landscape to some extent.

## Beaver Creek Management Unit

The Beaver Creek management unit contains about 1,165,000 acres of BLM-administered surface, 1,370,000 acres of federal mineral estate, and 323,000 acres of state and private lands.

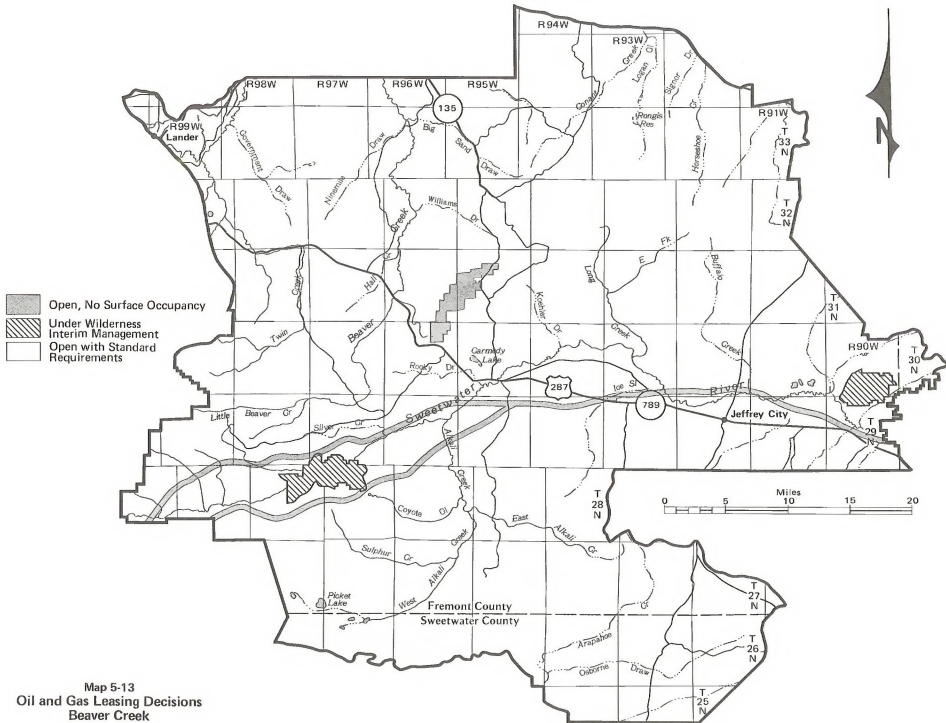
The Beaver Creek Management Unit has important uranium and oil and gas resources. It is extensively used for livestock grazing and contains valuable wildlife habitat. Several nationally significant cultural and historical sites, such as the Oregon/Mormon Trail and the Split Rock landmark are located within this unit.

## Energy and Minerals

### Oil and Gas

The preferred alternative for management of the Beaver Creek Management Unit would include keeping the entire unit open for oil and gas leasing, except for existing withdrawals and segregations, which encompass approximately 1,500 acres (see map 5-13). Oil and gas leases issued in areas rated as having moderate, low or no potential for the occurrence of oil and gas reserves would include a no-surface occupancy restriction to protect water quality, fisheries, riparian areas, sage grouse leks, steep slopes, threatened and endangered species, significant cultural sites, Jeffrey City, the Jeffrey City airport, Beaver Rim (starting at U.S. Highway 287 and extending north 8 miles), the proposed Ice Slough National Register site, and portions of the Oregon/Mormon Pioneer National Historic trails. In addition, seasonal restrictions would be applied to the leases to protect crucial wildlife habitat areas. In areas with moderate, low or no potential for occurrence of oil or gas, restrictions would be applied automatically before lease issuance. These restrictions could be waived later if appropriate. In areas with high potential for the occurrence of oil or gas, including KGSs, restrictions would not be automatically applied before lease issuance. Instead, new oil and gas leases in these areas would be conditioned with no surface occupancy and seasonal restrictions only when necessary to avoid a significant adverse impact on another resource. This alternative would further provide for the enhancement of oil and gas development in KGSs and high-potential areas through the waiver of lease restrictions when the lessee has demonstrated that adverse impacts to other resources could be acceptably mitigated.

Implementation of the preferred alternative would allow for maximum management flexibility over the full range of resources. In areas of moderate, low and no potential for occurrence of oil and gas, this alternative would allow for enhanced management of the surface resources, while providing opportunities for exploration and development of the oil and gas reserves. Conversely, in areas of high potential for the occurrence of oil and gas or in areas of established production such as KGSs, this alternative would allow for enhanced management of exploration and development activities by minimizing the restrictions imposed on these activities.



Map 5-13  
Oil and Gas Leasing Decisions  
Beaver Creek



## Preferred Alternative/Plan

### Locatable Minerals

The Beaver Creek Management Unit would be open for locatable mineral exploration and development, except for 1,200 acres around the Split Rock Landmark, Rocky Ridge and the Aspen Grove Site, areas withdrawn from appropriation under the mining laws, and an additional 280 acres proposed to be withdrawn from appropriations under the mining laws around Rocky Ridge (see map 5-14). A plan of operations would be required for all locatable mineral exploration and development activity (except casual use) within  $\frac{1}{2}$  mile of the Gillespie Place Historic Site and Willis Handcart Commemorative Site, Beaver Rim (starting at U.S. Highway 287 and extending north 8 miles), and the Ice Slough proposed National Register Site. A plan of operations would also be required for all locatable mineral exploration and development activities within  $\frac{1}{4}$  mile of the visible horizon of the Oregon/Mormon Pioneer Trail.

The preferred alternative places restrictions on locatable mineral exploration and development only in areas where these activities could cause significant adverse impacts to other significant resource values. This alternative provides for maximum opportunities for the exploration and development of the locatable mineral resources.

### Phosphates

The preferred alternative for management of the Beaver Creek Management Unit would include keeping the unit open for exploration and development of the phosphate reserves within the unit. All exploration permits and leases issued within the unit would include a no-surface occupancy restriction, when needed, to protect water quality, fisheries, riparian areas, sage grouse leks, steep slopes, threatened and endangered species, and significant cultural sites. In addition, seasonal restrictions would be applied to the leases as needed to protect crucial wildlife habitat areas (see Appendix 2).

The preferred alternative provides for the protection of sensitive surface resources, while providing for opportunities to explore and develop the phosphate reserves within the management unit.

### Fish and Wildlife

The preferred alternative provides for development of routine fish and wildlife habitat

improvement projects and maintenance of existing projects after appropriate review and where consistent with program capabilities and priorities. Special management actions and projects to improve fisheries and associated riparian habitats in the upper Sweetwater River and Beaver Creek drainages would also be undertaken. They would be included as objectives in a fisheries and riparian habitat-oriented, habitat management plan.

This alternative was selected because it provides for a concerted effort to address the problems of damaged and deteriorating fisheries and associated riparian habitats. The upper Sweetwater River and Beaver Creek drainages have the most extensive public land stream fisheries and stream-associated aquatic-riparian habitat base in the resource area. This area of high fisheries/riparian value overlaps the southwest part of the Beaver Creek Management Unit and the South Pass Management Unit. The fisheries and riparian habitats are mostly associated with small streams, commonly with aspen/willow and beaver pond complexes. There is high demand for the fishing opportunities in the area from local and regional outdoor recreationists attracted to the general South Pass historical area. The riparian habitats here also provide crucial winter habitat for Shiras moose and important habitat for fawning mule deer and many other animals.

Many of the important riparian-aquatic habitat values have been seriously damaged or lost as a result of mining activities and many years of excessive grazing pressure on stream bottoms. There is a relatively high potential for significantly improving fish and wildlife habitat, increasing recreational opportunities (fishing, hunting) and reducing further fish and wildlife resource losses under the preferred alternative.




### Landownership Adjustments and Utility Systems

The preferred alternative is to retain 17 isolated tracts and consider disposal of 26 isolated tracts through sale or exchange (see map 5-15).

Proposals for disposal or exchange received in the future would be considered on a case-by-case basis. If a certain proposal is determined to be consistent with the objectives of this RMP, it could be approved without preparing a planning amendment.

The 17 tracts (3,300 acres) to be retained are a portion of tract 68 (SE $\frac{1}{4}$ NE $\frac{1}{4}$ , NE $\frac{1}{4}$ NW $\frac{1}{4}$  of

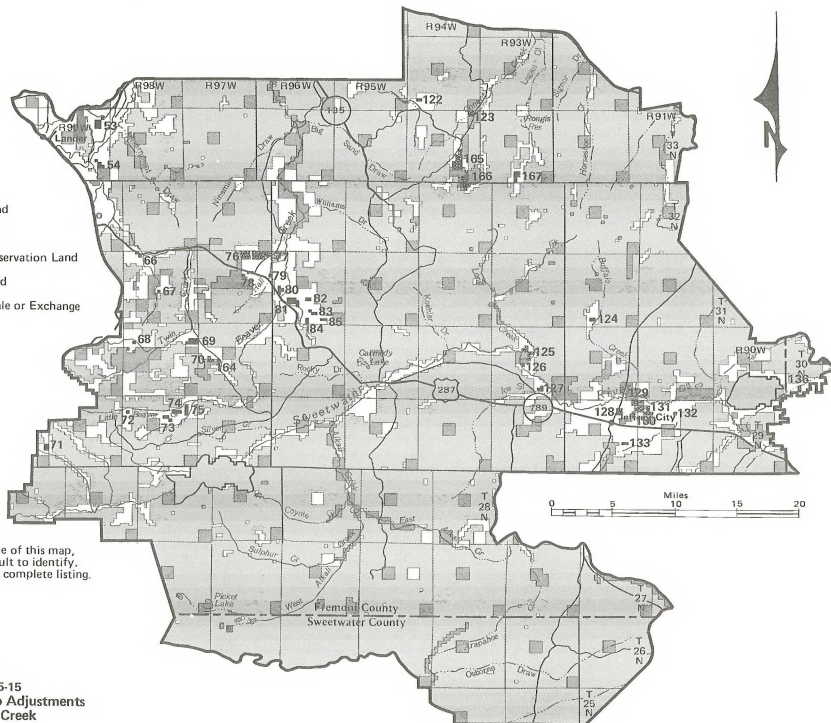


-  Existing Withdrawal
-  Open, Plans of Operations  
Required Except Casual Use  
Under Wilderness  
Interim Management
-  Open with Standard  
Requirements



Map 5-14  
Locatable Minerals  
Beaver Creek

-  Federal Land
-  State Land
-  Military Reservation Land
-  Private Land
-  Potential Sale or Exchange
-  Retain



Due to the small scale of this map, some areas are difficult to identify. Refer to the text for complete listing.

Map 5-15  
Landownership Adjustments  
Beaver Creek

## Preferred Alternative/Plan

section 18, T. 30 N., R. 98 W), tracts 70, 76, 77, a portion of tract 78 (SW $\frac{1}{4}$ SE $\frac{1}{4}$  of section 10, T. 31 N., R. 97 W), and tracts 123, 125, 126, 128, 129, 130, 131, 132, 136, 164, 165, and 166. The rationale for retaining these tracts varies. Some of the tracts are in the proximity of the Sweetwater River bottom and the associated riparian areas and provide a diversity of species habitat for wildlife. Other tracts have high-public values associated with the Oregon Trail. The remainder of the tracts have high-public recreational values because of legal access. In determining public access, it is assumed that state of Wyoming lands provide access to public lands managed by BLM.

The 26 tracts (3,438 acres) that would be considered for sale or exchange are tracts 53, 54, 66, 67, a portion of tract 68 (NE $\frac{1}{4}$ SE $\frac{1}{4}$  of section 7, T. 30 N., R. 98 W), tracts 69, 70, 71, 72, 73, 74, 75, a portion of tract 78 (N $\frac{1}{2}$ SW $\frac{1}{4}$  of section 11, T. 31 N., R. 97 W), and tracts 79, 80, 81, 82, 83, 84, 85, 122, 124, 125, 127, 133, and 167. These tracts are small, generally do not have legal access, do not have unique or significant resources, and would probably not result in a change of land use if sold or exchanged.

Also, part of the preferred alternative is that Recreation and Public Purpose Act leases and patents would be issued on a case-by-case basis. The rationale for this alternative is that R&PP actions would be analyzed in response to R&PP applications, and decisions as to compatibility with the unit's resource values would be considered at that time.

Except for three areas (the Oregon Trail corridor, the Sweetwater Canyon and the Sweetwater Rocks), the preferred alternative would allow construction of major utility systems throughout the Beaver Creek Management Unit. Rights-of-way might be granted within the three high-resource value areas mentioned above if no feasible alternative route or designated corridor were available. Utility systems would be concentrated in existing corridors whenever possible. The rationale for this alternative is that there would be no significant impacts resulting from construction of major utility systems, except in the three high-resource value avoidance areas.

### Recreation

The preferred alternative is to maintain the existing Split Rock interpretive site. The Split Rock interpretive site is incorporated in the management plan for the Oregon/Mormon Trail, which provides detailed planning with specific

objectives for use by visitors, resource protection, and interpretive needs consistent with public demand. The rest of the unit is part of an extensive recreation management area where dispersed recreation would be encouraged. Recreation management and maintenance would be minimal, with emphasis on the resolution of user conflicts and provide resource protection.

### Off-Road Vehicles (ORVs)

The preferred alternative is to continue the present ORV designations, which limit ORV use to existing roads and vehicle routes. This designation is determined to be appropriate for the majority of the public lands by accommodating access needs, while providing resource protection by limiting ORV use to existing roads and trails.

### Cultural/Natural History

The preferred alternative for the cultural/natural history program in the Beaver Creek Management Unit would affect two cultural resources and one important natural history resource. It would ensure that all actions are consistent with the Oregon/Mormon National Historic Trail Management Plan, it would encourage active negotiations to acquire the Burnt Ranch Historic site (an Oregon/Mormon Trail site), and it would encourage National Natural Landmark designation and enrollment of the Beaver Rim proposed National Natural Landmark area.

The Oregon/Mormon Trail Management Plan (described in chapter II) would establish protection, use and management guidelines for public land trail resources throughout the state of Wyoming, including the Lander Resource Area. Draft recommendations now formulated for the trail would establish the following in the Beaver Creek Management Unit: a  $\frac{1}{4}$  mile or visible horizon corridor (whichever is closer) on each side of selected trail segments, where modern intrusions and disturbances would be minimized or prohibited; and a protective withdrawal for the remainder of the Rocky Ridge site, Ice Spring Slough, Gilesie Place, Willies Handcart site, and a continuation of the protective withdrawal at the Split Rock Historic Landmark, and adoption of these recommendations would provide continued protection of this National Historic Trail and several of its highly important sites. This type of management would ensure compliance with National Trails System Act requirements for the

## Preferred Alternative/Plan

protection of important trail segments and sites, as well as provide for the preservation of several National Register listed and eligible trail properties. It would also continue longstanding efforts of BLM to protect and encourage public enjoyment of the trail.

Encouragement of negotiations to acquire the privately owned Burnt Ranch site could result in the transfer of a highly important Oregon/Mormon Trail site into public ownership. This National Register eligible site could compliment the Oregon/Mormon Trail resources of the Lander Resource Area by adding a major emigrant campsite, river crossing, crossroads, Pony Express station, and a U.S. mail and stage station site to the public domain. Existing historical resources would be preserved for future study and public enjoyment. Public ownership of the Burnt Ranch site would also enable better access through the general area for visitors wishing to reenact historical travel on the trail, as well as enable long-term management of local Sweetwater River frontage for the public good. Acquisition of Burnt Ranch by BLM would be in accordance with National Trails System Act guidance, which encourages acquisition of important trail resources when feasible. Acquisition would also provide for the long-term protection and preservation of a highly important National Register eligible trail resource.

Pursuing National Natural Landmark (NNL) status for a portion of Beaver Rim would establish protective status to this important natural history resource. Beaver Rim has been identified by the National Park Service as an eligible NNL candidate; NNL status provides for voluntary preservation of the natural values that exist within the NNL. This action would help to preserve the important natural values present (unique stratigraphic sequences with possible important fossil resources) at the Beaver Rim proposed NNL site. Lack of special management at this site might result in loss of identified important natural history resources, so the NNL designation/enrollment action was chosen over the alternatives not containing any actions concerning Beaver Rim.

### Fire Management

The Beaver Creek area has been divided into three suppression zones (see map 5-16). Each zone and its corresponding preferred alternative is:

#### Zone 1

Full suppression with limited use of heavy equipment such as bulldozers was chosen as the preferred alternative for this zone. This means that any wildfire would be fought as soon as it was discovered, using all resources with the exception of heavy equipment such as bulldozers. If the fire were not controlled in the first burning period, a decision would be made, using the escaped fire analysis, as to whether or not heavy equipment should be used to supplement other fire-fighting resources.

Full suppression was chosen, even though there are many areas where wildfires could enhance range and wildlife habitat, because of the large amount of private and state lands and property that could be damaged as a result of wildfires started on BLM administered lands. Prescribed burns would be used for range and wildlife habitat improvement.



#### Zone 2

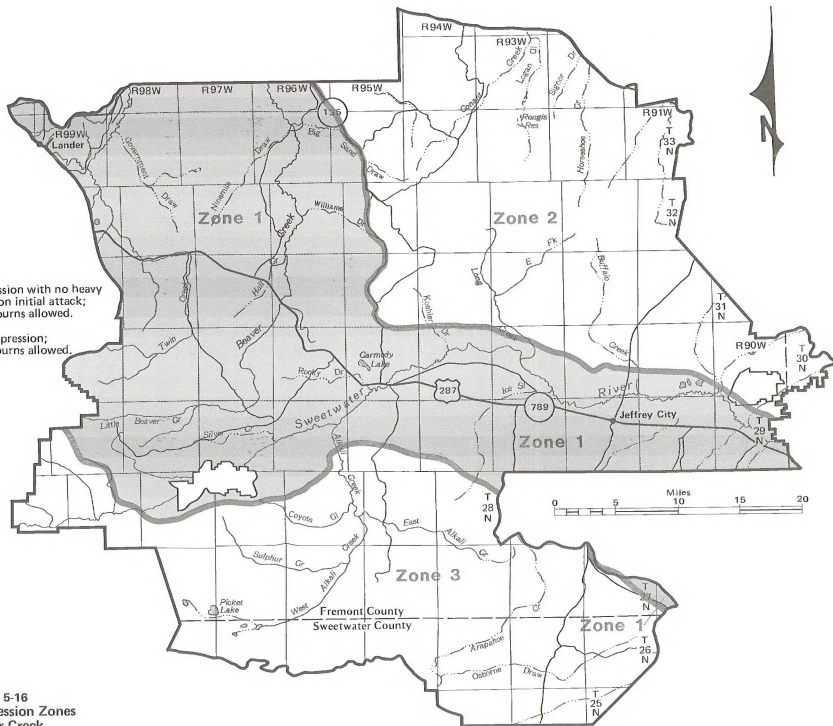
Limited suppression was chosen as the preferred alternative for this zone. The primary objective of this type of management is to reduce suppression costs in line with the resource damage the fire would have caused. Wildfires under this alternative would be suppressed when the fire 1) exceeds or has the potential to exceed the size specified in a predetermined plan, 2) threatens private property, 3) threatens other man made structures, or 4) threatens human life.

The Beaver Creek Management Unit has no history of large or damaging fires and only small, scattered amounts of private land are intermingled with public lands. Wildfires in this area would generally be beneficial to the wildlife habitat. Most environmental damage that occurs on fires is from the resources used to fight the fire. Under a limited suppression regime, less resource damage would occur from suppression activities, and suppression activities would be less costly.

#### Zone 3

Limited suppression was also chosen as the preferred alternative for this zone. The primary objective of this technique is to reduce suppression in line with the resource damage the fire would have caused. Wildfires under this alternative would be suppressed when the fire 1)

-  Full suppression with no heavy equipment on initial attack; prescribed burns allowed.  
 Limited suppression; prescribed burns allowed.



Map 5-16  
 Fire Suppression Zones  
 Beaver Creek



## Preferred Alternative/Plan

exceeds or has the potential to exceed the size specified in a predetermined plan, 2) threatens private property, 3) threatens other man-made structures, or 4) threatens human life.

### Access

The preferred alternative is to maintain existing BLM roads and easements. In addition, BLM would negotiate with landowners for easements as identified in the District Transportation Plan. As of 1985, this plan calls for negotiating easements on the East Beaver Creek, Twin Creek, Government Draw, Signor Ridge, Hudson-Atlantic City, Beaver Rim, Wolf Gap, Beef Gap and Dilabaugh Butte roads.

This alternative provides the most realistic overall transportation plan for those areas where access is needed for resource management on public lands. Roads would be kept to the minimum BLM standards necessary for the anticipated use. No roads would be upgraded in the Sweetwater Rocks area.

### Lander Slope Management Unit

The Lander Slope Management Unit contains about 25,000 acres of BLM-administered surface, 46,000 acres of federal mineral estate, and 62,000 acres of state and private land. There are no mining claims on the Lander Slope.

The Lander Slope is part of the northeast flank of the Wind River Mountains and forms the scenic backdrop for the Lander area and much of the Wind River Basin. It has a fragmented land and mineral resource ownership pattern. In recent years, industry has shown some interest in leasing oil, gas, and phosphates on the slope, even though the slope has low oil and gas potential for occurrence and low phosphate value. The area also has high recreational values, and contains one of the major concentrations of high value and crucial wildlife habitats in the resource area. There are two wintering areas used by the bald eagle and elk, and mule deer, moose and bighorn sheep forage on the slope. The Lander Slope also contains commercial quantities of timber, and the state has improved access and proposed timber harvests on parts of the slope.

### Energy and Minerals

#### Oil and Gas

The preferred alternative for management of the Lander Slope would include keeping the area open to oil and gas leasing, with restrictions. All new oil and gas leases issued within the management unit would include a no-surface occupancy restriction, where necessary, to protect water quality, fisheries, riparian areas, sage grouse leks, steep slopes, threatened and endangered species, significant cultural sites, and sensitive visual resources, for this management unit, this would include the majority of the area. In addition, seasonal restrictions would be applied to the leases to protect crucial wildlife habitat areas.

The preferred alternative would provide for the protection of sensitive visual resources as well as crucial wildlife habitats and fragile areas, while providing for opportunities to explore and develop the oil and gas reserves within the management unit. All of the lands within the management unit have been rated as having low potential for the occurrence of oil and gas.

#### Locatable Minerals

Under the preferred alternative, the entire management unit would be open to locatable mineral exploration and development. In order to protect important scenic and wildlife values, a plan of operations would be required for all locatable mineral exploration and development operations conducted within the highly visible steep slopes and areas with important wildlife habitat (see discussion on ACEC at the beginning of this chapter).

Because of the limited interest that has been expressed for locatable mineral exploration activities and low development potential in this area, adequate protection of significant surface resources could be achieved through the approval process for the plans of operations that would be required for all locatable mineral exploration and development activities along the Lander Slope.

#### Phosphates

The preferred alternative for management of the Lander Slope Management Unit would include phosphate prospecting, exploration and leasing.



## Preferred Alternative/Plan

Phosphate activities on the Lander Slope would be restricted to prevent significant adverse impacts to scenic values and important wildlife habitat. In some cases, these restrictions would impede or prevent the economic recovery of the phosphate resource and, thereby, make mining activities difficult or impossible (see Appendix 2 for examples of these restrictive measures).

Implementation of the preferred alternative would be consistent with past management efforts to protect the sensitive visual resources of the unit as well as crucial wildlife habitats and fragile areas. At the present time, there are no valid phosphate exploration permits or leases within the unit. The phosphate reserves within the unit have low development potential with multiple thin seams and 18 to 24 percent  $P_2O_5$ .

### Fish and Wildlife

Under the preferred alternative, development and maintenance of routine fish and wildlife habitat improvement projects would be completed after appropriate review and where consistent with capabilities and priorities. The Lander Slope Management Unit, along with the adjacent Red Canyon Management Unit, would encompass a high-priority area for development of a terrestrial habitat management plan, with elk being the primary species. There would be a cooperative effort with the Wyoming Game and Fish Department to integrate the management of their Red Canyon Habitat Management Unit into the plan.

Prescribed burns and other cultural practices would be initiated to rehabilitate elk, mule deer, moose, bighorn sheep, fisheries, and riparian habitats under this alternative.

This alternative was selected because it would establish a reasonable course of action to maintain and improve a variety of big game, fish and other wildlife habitats and reduce competition on some sites between big game species and between big game and livestock.

The Lander Slope Management Unit supports an exceptional concentration of high-value wildlife habitats, including crucial wintering range for elk, mule deer and moose; crucial yearlong range for bighorn sheep; winter habitat for bald eagles; several trout streams; and significant acreages of "high" and "moderate" priority standard habitat sites. Public lands in the Lander Slope Management Unit provide several major blocks of limiting habitat for the big game herds and other high-value wildlife inhabiting the south end of the Wind

River Mountains. Considering that other land uses will continue on these lands and the shrinking habitat values on much of the nonpublic lands along the Lander Slope, it is important to establish an active program of habitat maintenance and improvement in both the Red Canyon and Lander Slope Management units in order to maintain the exceptional fish and wildlife resource values.

### Forest Management

The preferred alternative for the Lander Slope Management Unit would entail offering one or more sales for a total of approximately 10 MMBF, to be harvested over a period of not more than 5 years. After this initial period, activity would cease for about 10 years, and the roads constructed for logging would be closed. After this period, similar sales would be offered again in the area.

This sequence of harvesting timber would allow the establishment of uneven-aged stands, which would enhance both the timber condition and wildlife habitat. As on Green Mountain, the wildlife habitat would be enhanced by creating more forage on a continual basis. The timber condition would be improved by replacing the dead and dying stands with vigorous regeneration and by separating the harvested stands to make the future stands less susceptible to mountain pine beetle epidemics.

Harvesting of conifer stands would utilize irregularly shaped clearcuts up to 25 acres in size. Only partial cutting would be allowed within 100 feet of perennial streams. No harvesting with conventional logging equipment (bulldozers or rubber-tired skidders) will be allowed on slopes over 45 percent.

An attempt would be made to maintain a ratio of approximately 40 percent cover to 60 percent openings in the contiguous timbered areas for optimum elk habitat.

Harvested sites would be prepared for regeneration by piling and burning the unuseable debris left after logging.

Natural regeneration would be expected because it has proven successful in the past in lodgepole pine forests, but if it were unsuccessful in certain areas, artificial regeneration (planting or direct seeding) would be employed.

Precommercial and commercial thinnings would be utilized as required to manage new timber stands.

## Preferred Alternative/Plan

### Landownership Adjustments and Utility Systems

The preferred alternative is to retain 13 isolated tracts and to consider sale or exchange of 14 isolated tracts. The 13 tracts (3,040 acres) that would be retained in public ownership (see map 5-17) would include tracts 39, 41, 42, 43, 50, 51, 52, 57, 58, 60, part of 61 (SW¼NW¼ of sec. 30, T.32N., R.99W., and E¼NE¼ of sec. 25, T.32N., R.100W.), 65, and 161. The rationale for retaining these tracts is that they have important wildlife values and legal public access. In a few instances there would be no legal access, but there would be potential for a land-use change to rural homesites if the lands were disposed of, therefore adversely impacting important wildlife habitat.

The 14 tracts (1,441 acres) that would be disposed of are tracts 40, 44, 45, 46, 47, 48, 49, 55, 56, 59, part of 61 (NE¼NW¼ of sec. 30, T.32N., R.99W.), 62, 63, and 64. The rationale for disposing of these lands is that there would be no legal access to the lands for management purposes, there are no significant or unique public resources, and there would probably be little potential for an adverse land use change if they were sold or exchanged.

Proposals for disposal or exchange received in the future would be considered on a case-by-case basis. If a certain proposal is determined to be consistent with the objectives of this RMP, it could be approved without preparing a planning amendment.

Recreation and Public Purpose Act patents would be issued on a case-by-case basis in response to applications and an analysis of the compatibility of the proposal with the resource values in the area.

The preferred alternative is to avoid the Lander Slope Management Unit when locating major utility systems. Major utility systems would be allowed; no feasible alternative route or designated right-of-way corridor were available. The lowlands near Highway 28 and 789 would be considered for utility systems before allowing utility systems on the slopes of the mountain.

### Recreation

The preferred alternative is to manage the Lander Slope Management Unit for extensive recreational opportunities, with no special

management actions. A 14-day camp limit and quotas on commercial hunting camps would be set.

No major recreational developments are planned in this unit. The Lander Slope Management Unit would be managed as an extensive recreation management area where dispersed recreation rather than intensive recreational use would be encouraged and where visitors would have freedom of choice with minimal regulatory constraint. Recreation management would emphasize resolving user conflicts and providing resource protection. Establishing quotas for hunting camps would reduce conflicts between commercial recreational use permits and be in conformity with permit quotas on U.S. Forest Service lands. A 14-day camping limit would eliminate "domicile" or "homestead" camping.

### Off-Road Vehicles

The preferred alternative would continue the present ORV designations that limit ORV use to designated roads and vehicle routes.

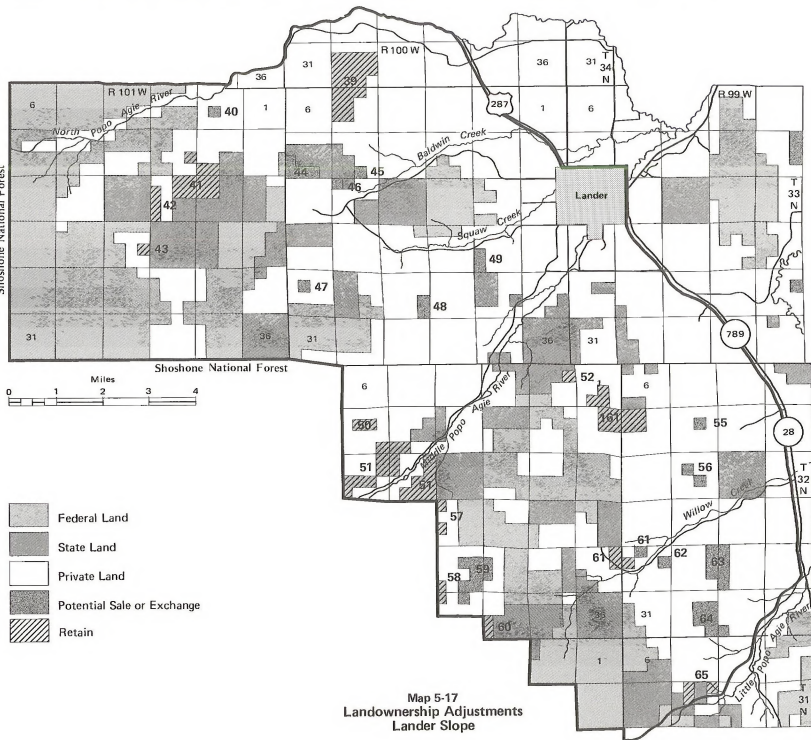
The existing ORV plan is consistent with adjoining national forest lands. Long- and short-term resource damage, user access requirements, and public safety suggest that limitation of ORV use would be in the best public interest. Roads and vehicle routes would be closed seasonally in order to protect the roadbed, watershed values, visual resources, and avoid disturbing wildlife on their winter range.

### Fire Management

Full suppression with limited use of heavy equipment was chosen as the preferred alternative for the Lander Slope Management Unit. This would entail an aggressive initial attack using all available resources, with the exception of heavy ground equipment such as bulldozers. The objective would be to suppress wildfires as quickly as possible to reduce potential damage. As with other areas, the uncontrolled use of heavy equipment has the potential of creating more environmental damage than the fire itself would cause. This is a major concern in this highly scenic area on the front of the Wind River range.

The Lander Slope has large amounts of intermingled private and state lands, receives

Shoshone National Forest



## Preferred Alternative/Plan

heavy recreational use and has a history of man-caused fires. It also has extensive areas of winter range habitat for big game herds. For these reasons, uncontrolled fires could have the potential of creating severe damage to various resources, and full suppression would be the most logical fire management alternative.

### Access

The preferred alternative is to negotiate with landowners to obtain easements as identified in the District Transportation Plan. As of 1985, this plan calls for negotiating easements for public access on the Shoshone Lake Road to Mormon Basin.

The Shoshone Lake Road is the key access to over 5,000 acres of blocked public land adjoining the national forest. Public access across state and private lands is needed to reach the public lands in Mormon Basin and to provide vehicle access to Mormon Basin for hunting and for reaching the national forest. Legal access is also needed for forest and wildlife management.

### Red Canyon Management Unit

The Red Canyon Management Unit contains about 15,000 acres of BLM-administered surface, 17,000 acres of federal mineral estate, and 8,000 acres of state and private lands (see map 5-18). There are 128 mining claims within this management unit. These claims are primarily for bentonite and, for the most part, are not within the National Natural Landmark or the crucial elk winter range.

This management unit contains a national natural landmark and a wildlife habitat management unit for wintering elk that is managed by the Wyoming Game and Fish Department. Recently, industry has shown some interest in leasing oil, gas and phosphate, but, like the Lander Slope unit, this unit has low development potential for these resources.

### Energy and Minerals

#### Oil and Gas

The preferred alternative for management of the Red Canyon Management Unit would include keeping the area open to oil and gas leasing, with restrictions. All new oil and gas leases issued

within the management unit would include a no surface occupancy restriction, where necessary, to protect water quality, fisheries, riparian areas, sage grouse leks, steep slopes, threatened and endangered species, significant cultural sites, and the Red Canyon National Natural Landmark. In addition, seasonal restrictions would be applied to leases to protect crucial wildlife habitat areas.

The preferred alternative provides for the protection of sensitive visual resources as well as crucial wildlife habitats, fragile areas and the Red Canyon National Natural Landmark. It also provides opportunities to explore and develop the oil and gas reserves within the management unit. All of the lands within the management unit have been rated as having low potential for the occurrence of oil and gas. The preferred alternative is consistent with the management objectives for the Red Canyon National Natural Landmark, which is to preserve the natural and scenic values of the area.

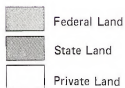
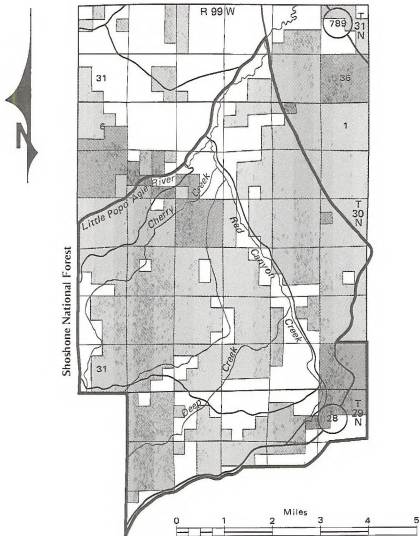
#### Locatable Minerals

Under the preferred alternative, the entire management unit would be open to locatable mineral exploration and development. In order to protect important scenic and wildlife values, a plan of operations would be required for all locatable mineral exploration and development operations conducted within the highly visible steep slopes and areas with important wildlife habitat (see discussion on ACECs at the beginning of this chapter).

Because of the limited interest that has been expressed for locatable mineral exploration activities and the low-development potential in this area, adequate protection of significant surface resources could be achieved through the approval process for the plans of operations that would be required for all locatable mineral exploration and development activities along the Lander Slope and within the Red Canyon National Natural Landmark.

#### Phosphates

The preferred alternative for the National Natural Landmark and the crucial elk winter range within the Red Canyon Management Unit would include closing these two areas to phosphate exploration and leasing, which would require a withdrawal. The remainder of the unit would be open to prospecting, exploration and development, and leasing with restrictions, as appropriate to protect important surface values (see Appendix 2).



Map 5-18  
 Surface Ownership  
 Red Canyon



## Preferred Alternative/Plan

Implementation of the preferred alternative would be consistent with past management efforts to preserve the natural and scenic characteristics of the Red Canyon National Natural Landmark as well as crucial big game habitats, fragile areas and sensitive visual resources. There are no phosphate exploration permits or leases within the unit. The phosphate reserves within the unit have low development potential with multiple thin seams and 18 to 24 percent  $P_2O_5$ .

### Fish and Wildlife

Under the preferred alternative, development and maintenance of routine fish and wildlife habitat improvement projects would be completed after appropriate review and where consistent with capabilities and priorities. The Red Canyon Management Unit, along with the adjacent Lander Slope Management Unit, would encompass a high-priority area for development of a terrestrial habitat management plan, with elk being the primary species. This would be a cooperative habitat management plan with the Wyoming Game and Fish Department integrating the management of their Red Canyon habitat management unit into the plan. There would continue to be an allocation of 500 AUMs of forage for elk from public lands in the management unit, as established in the 1953 cooperative agreement between the Wyoming Game and Fish Department and the BLM. Limited prescribed burns and other cultural practices would be used to rehabilitate elk, mule deer, moose, bighorn sheep, fisheries, and riparian habitats under this alternative. In-stream structures and fencing would be used in the Barret Creek drainage to improve fisheries and riparian habitat.

This alternative was selected because it provides for continuing support of the longstanding cooperative agreement with the Wyoming Game and Fish Department. It outlines a reasonable course of action to improve a variety of big game, fish and other wildlife habitats and to reduce competition on some sites between big game species and between big game and livestock.

The Red Canyon unit supports an exceptional concentration of high-value wildlife habitat, including crucial wintering range for elk, mule deer, and moose; crucial yearlong range for bighorn sheep; winter habitat for bald eagles; several trout streams; and significant acreages of high and moderate priority standard habitat sites. Public lands in the Red Canyon unit provide a major block of limiting habitat for the big game

herds and other high-value wildlife inhabiting the south end of the Wind River Mountains. Considering that other land uses will continue on these lands and the shrinking habitat values on much of the nonpublic lands along the adjacent Lander Slope, it is important to establish an active program of habitat maintenance and improvement in both the Red Canyon and Lander Slope management units in order to maintain the exceptional fish and wildlife resource values found there.

### Forest Management

The preferred alternative for the Red Canyon Management Unit would be to consider timber sales on an individual sale basis since the timber resources are very limited. The major objective in this area would be to improve wildlife habitat by utilizing prescribed burns and possibly some harvesting in the timber stands, mainly the aspen. Harvesting in the aspen stands would be limited to partial cuts or clearcuts up to 5 acres in size. This would remove the deteriorating older trees and produce regeneration. These stands would probably regenerate naturally.

This area contains many stands of aspen and several small stands of coniferous timber scattered over a large area. The area is very rugged, with little existing access. The small amount of existing access is over very rough roads to the isolated patches of timber. The past demand for timber in this area has been very minimal, mainly from the ranchers who have allotments in the area.

Harvesting in conifer stands would be limited to partial cutting to remove the dead and dying trees and facilitate regeneration. Natural regeneration would be expected, but if unsuccessful, some artificial methods would be employed.

### Landownership Adjustments and Utility Systems

No public lands were considered in the unit for landownership adjustments. Proposals for disposal or exchange received in the future would be considered on a case-by-case basis. If a certain proposal is determined to be consistent with the objectives of this RMP, it could be approved without preparing a planning amendment. However, Recreation and Public Purpose Act leases and patents would be considered as applications are received.

The Red Canyon Management Unit would be avoided when locating major utility systems



## Preferred Alternative/Plan

because of potential adverse affects to the high scenic values, wildlife habitat and watershed values. Rights-of-way for major utility systems may be granted only when no feasible alternative route or designated corridor is available.

### Recreation

The preferred alternative is to develop an interpretive marker for the Red Canyon National Natural Landmark (NNL), establish a 14-day camping limit, limit commercial hunting camps, and close Red Canyon elk winter range to all winter sport activities.

A 14-day camping limit would eliminate "domicile" or "homestead" camping. An interpretive panel at the Red Canyon Overlook on U.S. Highway 287 would show the significance of the National Natural Landmark and describe the geology and wildlife values. A plaque for NNL enrollment would be furnished by the National Park Service. It could be a cooperative venture with the Wyoming Game and Fish, Wyoming Recreation Commission, Wyoming Highway Department, and BLM.

### Off-Road Vehicles (ORVs)

The preferred alternative would limit ORV use to designated roads and vehicle routes and impose a seasonal closure from December 1 to June 15, as provided for in the existing ORV designations for the area.

The existing designations are consistent with adjoining national forest lands. Long- and short-term resource damage, user access requirements, and public safety suggest that limitation of ORV use would be in the best public interest. Roads and vehicle routes would be closed seasonally in order to protect the roadbed, watershed values, visual resources, and avoid disturbing wildlife on their winter range.

### Cultural/Natural History

The preferred alternative for the cultural/natural history program in the Red Canyon Management Unit would affect one natural history resource. It would provide for preservation of the NNL's natural character and qualities.

Protection of the Red Canyon NNL would help prevent disruption and loss of natural values of this important geological landmark. This canyon is the only designated National Natural Landmark in the Lander Resource Area, and continued protection would ensure future appreciation of this classic natural history resource.

### Fire Management

Full suppression with limited or restricted use of heavy equipment for fire-fighting was selected as the preferred alternative for the Red Canyon Management Unit. This would mean an aggressive initial attack of wildfires using all available resources, with the exception of heavy equipment such as bulldozers. If the fire were not contained during the initial attack phase, a decision could be made, utilizing the escaped fire analysis, whether or not heavy equipment should be used to supplement the other fire-fighting resources.

This area is a crucial wintering area for big game, especially elk, and it has intermingled private and state lands. It also has heavy fuel in timber stands, is adjacent to U.S. Forest Service timbered lands, and receives relatively heavy recreational use in the summer and fall.

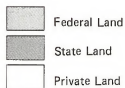
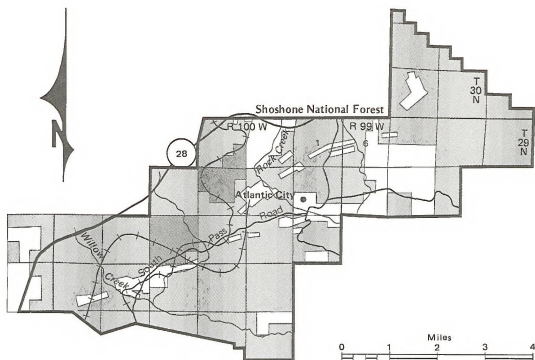
Use of full suppression techniques would limit potential damage to big game winter range on public lands, limit potential damage on private lands in the area, reduce potential danger to recreationists, and reduce potential adverse impacts to the visual qualities in the area.

### Access

The preferred alternative is to maintain the existing transportation system. Unnecessary roads have already been closed and rehabilitated. Currently, recreational land-use agreements provide adequate public access to BLM lands. Thus, no new easements have been identified at this time.

### South Pass Management Unit

The South Pass Management Unit contains about 14,000 acres of BLM-administered surface, 15,000 acres of federal mineral estate, and 5,000 acres of state and private lands (see map 5-19).



Map 5-19  
Surface Ownership  
South Pass

## Preferred Alternative/Plan

There are 955 mining claims in this unit. These claims are primarily for gold and are spread evenly throughout the management unit.

South Pass has been the primary gold-mining region in the state of Wyoming. Settlement began in the late 1860s and has continued to the present. This unit also has significant recreational and wildlife values, including important moose habitat. The unit has low to no potential for the occurrence of oil and gas, but other mineral resources do occur. Mining claims exist on most of the area.

### Energy and Minerals

#### Oil and Gas

The preferred alternative for management of the South Pass Management Unit would include keeping the area open to oil and gas leasing, with restrictions. New oil and gas leases issued within the management unit would include a no surface occupancy restriction, where necessary, to protect water quality, fisheries, riparian areas, sage grouse leks, steep slopes, threatened and endangered species, significant cultural sites, critical moose habitat, and all federal mineral estate within the proposed South Pass National Register Mining District and the Atlantic City and Big Atlantic Gulch campgrounds (see map 5-20). In addition, seasonal restrictions would be applied to leases to protect crucial wildlife habitat areas. Upon completion of the ongoing reconnaissance inventory of historical resources within the proposed South Pass National Register Mining District, the boundary of the district would be redefined to exclude all areas that are devoid of significant historical resources.

The preferred alternative provides for the protection of historical resources within the proposed South Pass National Register Mining District, as well as to crucial wildlife habitats and fragile areas, while providing opportunities to explore for and develop the oil and gas resources within the management unit.

#### Locatable Minerals

Under the preferred alternative, the entire management unit, except for 1,727 acres presently segregated from appropriation under the mining laws, would be open for locatable mineral exploration and development. A plan of operations would be required for all locatable mineral exploration and development operations conducted within the South Pass Historic Mining

District, except for those activities qualifying as casual use (see map 5-21).

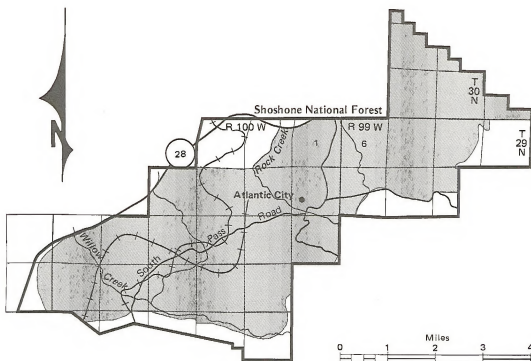
Because of the nature of the present and anticipated future locatable mineral activities (small scale gold mining and dredging) in the management unit, adequate protection of significant surface resources could be achieved through the approval process of the plans of operation that would be required for all locatable minerals activities (except casual use) within the South Pass Mining District.

### Fish and Wildlife

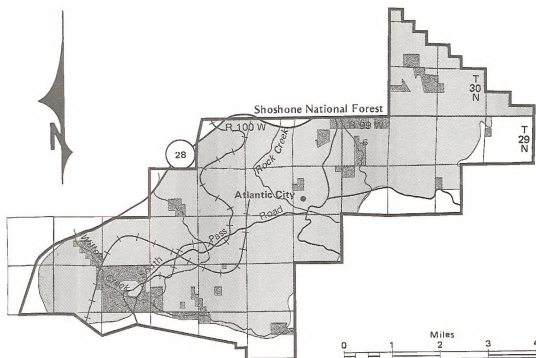
Under the preferred alternative, development and maintenance of routine fish and wildlife habitat improvement projects would be completed after appropriate review and where consistent with capabilities and priorities. The South Pass Management Unit would be the top priority area for development of an aquatic habitat management plan aimed at fisheries, beaver and riparian habitat improvement. Special management action under the plan would include aspen management, beaver management, in-stream structure development, and fencing. Additional emphasis would be placed on this unit to improve conifer, aspen, willow-riparian, and other shrub stands, which make up an important part of the winter range for the Lander moose herd and provide important habitat for many other species. Prescribed burns and other cultural practices designed to promote aspen and willow regeneration and improve conifer stands would be implemented.




This alternative was selected because it provides the necessary management emphasis to begin correcting the problems of damaged and deteriorated aquatic habitats, winter moose range, and riparian habitats, plus it begins to develop the potential for enhancement of these habitats and associated recreational opportunities. The South Pass unit is the core area of the most extensive stream fishery resource on public land in the resource area. It also supports one of the most important concentrations of winter moose habitat.

There is high demand for the fishing opportunities in the area as a result of the local and regional recreational use attracted to the South Pass historical area, the varied wildlife resources, the area's pleasing aesthetic qualities, and the camping facilities. Gold mining activities, which have been occurring for over 100 years, continue to damage the fisheries and riparian habitats in the unit. Long-term excessive grazing



Map 5-20  
Oil and Gas Leasing Decisions  
South Pass



-  Existing Withdrawals
-  Open, Plans of Operations Required Except Casual Use
-  Open with Standard Requirements

Map 5-21  
Locatable Minerals  
South Pass

## Preferred Alternative/Plan

of stream bottoms has also caused serious damage to aquatic and riparian habitats. Protection and enhancement of these habitats occurring on public lands would help offset these losses.

### Forest Management

The preferred alternative for the South Pass Management Unit would entail selling small volumes of timber on a demand basis to local commercial timbercutters. There are only about 150 acres of conifer stands remaining that contain significant amounts of harvestable timber. Harvesting in these stands would be limited to partial cuts to remove the dead and dying timber and to regenerate the stands. This will leave residual stands to help maintain wildlife cover and watershed protection. Aspen stands would be managed to create healthy wildlife habitat. This could take the form of harvesting in clearcuts or prescribed burning.

Natural regeneration would be expected on for the harvested areas. If this were not successful in certain areas, artificial methods (planting or direct seeding) would be employed.

### Landownership Adjustments and Utility Systems

There were no tracts considered for sale or exchange in the South Pass Management Unit. Proposals for disposal or exchange received in the future would be considered on a case-by-case basis. If a certain proposal is determined to be consistent with the objectives of this RMP, it could be approved without preparing a planning amendment. However, Recreation and Public Purpose Act leases and patents would be considered as applications are received.

The preferred alternative is to avoid the area when locating major utility systems. Rights-of-way for major utility systems might be granted if no feasible alternative route or designated right-of-way corridor were available. The rationale is that historical and cultural values would be adversely impacted by major utility systems. The area is also very scenic, with fairly intensive recreational use, and it is important to maintain these values.

### Recreation

The preferred alternative is to maintain existing campgrounds and facilities. No new campgrounds would be built.

The South Pass Historic Mining Area is a special recreation management area. Management would be oriented toward maintaining recreational opportunities in terms of rustic, open-space settings. Areas of intensive management would include existing campgrounds, the Miners Delight Townsite, and Peabody Ridge Overlook. Development would be limited to facilities that would protect visitors and resources. There is strong public sentiment for maintaining this area with minimal developments. A management plan would provide detailed planning for special recreation management areas.

### Off-Road Vehicles

The preferred alternative is to continue the present ORV designations that limit ORV use to existing roads and vehicle routes. This designation is determined to be appropriate for the majority of the public lands by accommodating access needs, while providing resource protection. It limits ORV use to existing roads, except for casual use such as picking up a game animal during hunting season.

### Cultural/Natural History

The preferred alternative for the cultural/natural history program in the South Pass Management Unit would affect several historical mining resources. It would provide a management plan to guide activities within the proposed South Pass National Register Mining District. The plan would include the following three management actions: accelerated stabilization, preservation, and protection of all significant historical sites within the proposed South Pass National Register Mining District; historical site patrol to deter vandalism; and conformance with local historical zoning laws on public lands surrounding South Pass City. The preferred alternative would also provide limited test excavations at the Miners Delight historical townsite to facilitate interpretation of the site.



## Preferred Alternative/Plan

A management plan for the proposed South Pass National Register Mining District would provide a well-planned management program for this fragile and important historical area. Accelerated stabilization, preservation, and protection of all significant historical sites would prevent deterioration of the various 19th and early 20th century historical resources located within the South Pass area. Many of the historical resources of the area have already suffered from natural and human caused deterioration such as weathering, damage from livestock, and damage from vandalism; therefore, short-term action is necessary to prevent severe damage to historical sites. For this reason, accelerated protection measures were chosen over more gradual measures.

Patrolling and monitoring of sites in the proposed South Pass National Register Mining District would deter destruction of historical sites by vandals. Over the past 20 years, artifact hunters and vandals have caused a high loss of historical integrity in the sites of South Pass and have destroyed entire standing historical structures in some cases. BLM has invested substantial amounts of money to provide for public use and enjoyment of the South Pass area; therefore, control of vandalism is necessary to preserve one of the main attractions of South Pass, the historical resources.

Conformance with a local historical zoning ordinance around South Pass City by BLM would provide for maintenance of the historical setting surrounding the town. BLM is a participant in the preservation of the historical values of the local area (BLM leases lands that possess historical structures to the Wyoming Recreation Commission for historical appreciation purposes) and recognizes the local residents' wishes to maintain the historical character of the area. In addition, the public lands in the section in which South Pass City lies are within the South Pass City National Register site.

Limited test excavations within the Miners Delight townsite would help our understanding of the various occupations that occurred at the site. Accounts of the townsite's history are limited and little is known of the site before its 1910 to 1914 occupation phase. This limited test excavation management action was chosen because limited excavations would facilitate interpretation of the site for the public benefit.

### Fire Management

Full suppression was chosen as the preferred alternative for the South Pass Management Unit. This would entail utilizing all available resources to suppress wildfires in the area.

There are potential negative aspects of unrestricted use of equipment, such as damage to soils, vegetation and stream courses by heavy equipment and the potential visual and environmental degradation from fire retardant released from planes. However, this is a very high-use recreation area containing two active communities (South Pass City and Atlantic City), a state park in South Pass City and many historical mining structures. It also has many other resource values including fisheries, wildlife, recreation, soils and forestry. In addition, there are intermingled private lands with property such as homes and mine facilities that need protection from wildfires starting on public lands.

With the many resource values and the large amounts of private lands that could be damaged by uncontrolled fires, BLM decided to continue a policy of full suppression.

### Access

The preferred alternative is to maintain existing BLM roads and easements. The existing transportation system provides adequate recreational access for the South Pass Area.

### Gas Hills Management Unit

The Gas Hills Management Unit contains about 872,000 acres of BLM-administered surface, 1,060,000 acres of federal mineral estate, and 378,000 acres of state and private lands.

Gas Hills is a important management unit for oil and gas leasing and development. Until the recent slump in uranium markets, uranium mining and milling were significant activities in the area. Livestock grazing and rangeland management are also important issues in this unit, and there are several important winter ranges for elk, deer and antelope. Part of the Oregon/Mormon Trail runs through this unit, and another highly significant cultural site, Castle Gardens, is in the northern portion of the unit.

## Preferred Alternative/Plan

### Energy and Minerals

#### Oil and Gas

The preferred alternative for management of the Gas Hills Management Unit would include keeping the entire unit open for oil and gas leasing, except for existing segregations and withdrawals, which encompass 720 acres (see map 5-22). New oil and gas leases issued in areas rated as having moderate, low or no potential for the occurrence of oil and gas reserves would include a no surface occupancy restriction to protect water quality, fisheries, riparian areas, sage grouse leks, steep slopes, threatened and endangered species, significant cultural sites (including 80 acres at the Castle Gardens rock art and picnic site),  $\frac{1}{4}$  mile either side of designated portions of the Oregon/Mormon Trail or the visible horizon, whichever is closer, Martin's Cove National Register Site, and the interpretive site at Devil's Gate. In addition, seasonal restrictions would be applied to leases to protect crucial wildlife habitat areas. In areas with moderate, low or no potential for occurrence of oil or gas, restrictions would be applied automatically prior to lease issuance. These restrictions would be waived later if appropriate. In areas with high potential for the occurrence of oil or gas including KGSSs, restrictions would not be automatically applied prior to lease issuance. Instead, new oil and gas leases in these areas would be conditioned with no-surface occupancy and seasonal restrictions on a case-by-case basis and only when necessary to avoid a significant adverse impact to another resource. This alternative would further provide for the enhancement of oil and gas development in KGSSs and high-potential areas through the waiver of lease restrictions following a commitment from the lessee that adverse impacts to other resources could be acceptably mitigated.

Implementation of the preferred alternative would allow for maximum management flexibility over the full range of resources. In areas of moderate, low and no potential for occurrence of oil and gas, this alternative would allow enhanced management of the surface resources, while providing opportunities for exploration and development of the oil and gas resources. Conversely, in areas of high potential for the occurrence of oil and gas or in areas of established production such as KGSSs, this alternative allows enhanced management of exploration and development activities by minimizing the restrictions imposed on these activities.

#### Locatable Minerals

The Gas Hills Management Unit would be open to locatable mineral exploration and development, except for 80 acres presently segregated from appropriation under the mining laws, 720 acres presently withdrawn from appropriation under the mining laws and an additional 600 acres around the Martin's Cove National Register Site, which is proposed to be withdrawn from appropriation under the mining laws (see map 5-23). In addition, a plan of operations would be required for all locatable mineral exploration and development activities within  $\frac{1}{4}$  mile either side of the Oregon/Mormon Trail or the visible horizon, whichever is closer.

The preferred alternative places few restrictions on locatable mineral exploration and development and then only in areas where these activities could cause significant adverse impacts on other significant resource values. This alternative maximizes opportunities for the exploration for and development of locatable mineral resources.

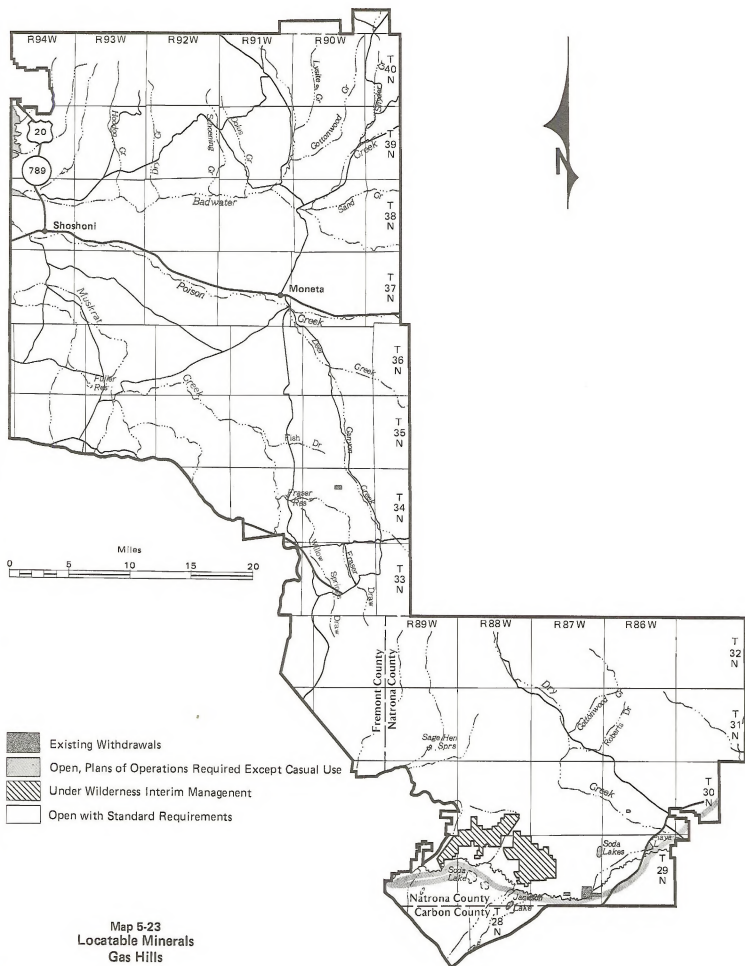
#### Fish and Wildlife

The preferred alternative provides for development of routine fish and wildlife habitat improvement projects and maintenance of existing projects after appropriate review and where consistent with program capabilities and priorities. BLM will cooperate with the Wyoming Game and Fish Department, interested sportsmen, conservation groups, and adjacent landowners in efforts to develop a workable bighorn sheep reintroduction program for the Sweetwater Rocks area.

This alternative was selected based on the following:

—The Wyoming Game and Fish Department has asked BLM to consider approval of a bighorn sheep reestablishment program in this ancestral bighorn range. A recent habitat/forage inventory covering over 40,000 acres of the reintroduction area has been conducted. The results of this inventory indicated that there is an ample amount of suitable habitat available. The total potential habitat area is about 85 percent BLM land and 15 percent state and private rangeland. About 67 percent of the total habitat area is unused and unsuitable for livestock grazing. This 67 percent represents the best potential bighorn





## Preferred Alternative/Plan

habitat. It is largely unoccupied, with the exception of a relatively low density mule deer population. Assuming 50 percent of the forage production for allowable use and reserving adequate forage for the mule deer herd, there is ample forage in the area unused by livestock to support several times the number of bighorns proposed as a possible long-term population goal (up to 400 sheep, base population). If a successful reintroduction program were accomplished, the following benefits would be realized:

- A previously extirpated species would be restored to ancestral habitat.
- Unoccupied public land habitat would be restored to big game production.
- The population of one of the state's and nation's most valuable, prized, and scarce big game animals would be expanded.
- Opportunities for aesthetics and sport hunting would be increased.

The most significant concerns yet to be worked out are those expressed by adjoining landowners. Their concerns include sheep use on adjacent private lands and the added time and expense of managing people in the area (e.g. trespass and requests for permission to cross private lands).

### Landownership Adjustments and Utility Systems

A total of 60 isolated tracts of public land were reviewed to determine whether they should be sold, exchanged or retained in public ownership. The preferred alternative is to retain 20 isolated tracts and consider 40 tracts for sale or exchange (see map 5-24).

Proposals for disposal or exchange received in the future would be considered on a case-by-case basis. If a certain proposal is determined to be consistent with the objectives of this RMP, it could be approved without preparing a planning amendment.

The 20 tracts, encompassing approximately 2,302 acres, which would be retained are tracts 94, 95, 103, 104, 107, 111, 113, 114, 115, 116, 117, 120, 142, 148, 151, 152, 153, 154, 155, and 157. The rationale for retaining these tracts is that they have high value for public recreation because of existing legal access or they have historical value associated with the Oregon Trail. Tract 120 has wildlife water development.

The 40 tracts, totaling approximately 3,472 acres, which could be considered for sale or exchange, are tracts 86, 87, 88, 89, 90, 91, 92, 93, 96, 97, 98, 99, 100, 101, 102, 105, 106, 108, 109, 110, 112, 118, 119, 121, 137, 138, 139, 140, 141, 143, 144, 145, 146, 147, 149, 150, 156, 158, 159, and 167. The rationale for considering these tracts for sale or exchange is that the majority are small and very isolated without legal access. The lands do not have unique or significant resource values and the existing land use probably would continue as livestock grazing and wildlife habitat. Tracts 158 and 159 have public access but do not have significant resource values. The preferred method of disposal for these tracts would be for exchange purposes to enhance management of cultural, recreation, wildlife, or other resources on public land.

Recreation and Public Purpose Act leases and patents would be issued on a case-by-case basis. The rationale for this alternative is that R&PP actions would be analyzed in response to applications, and decisions as to compatibility with the unit's resource values would be considered at that time.

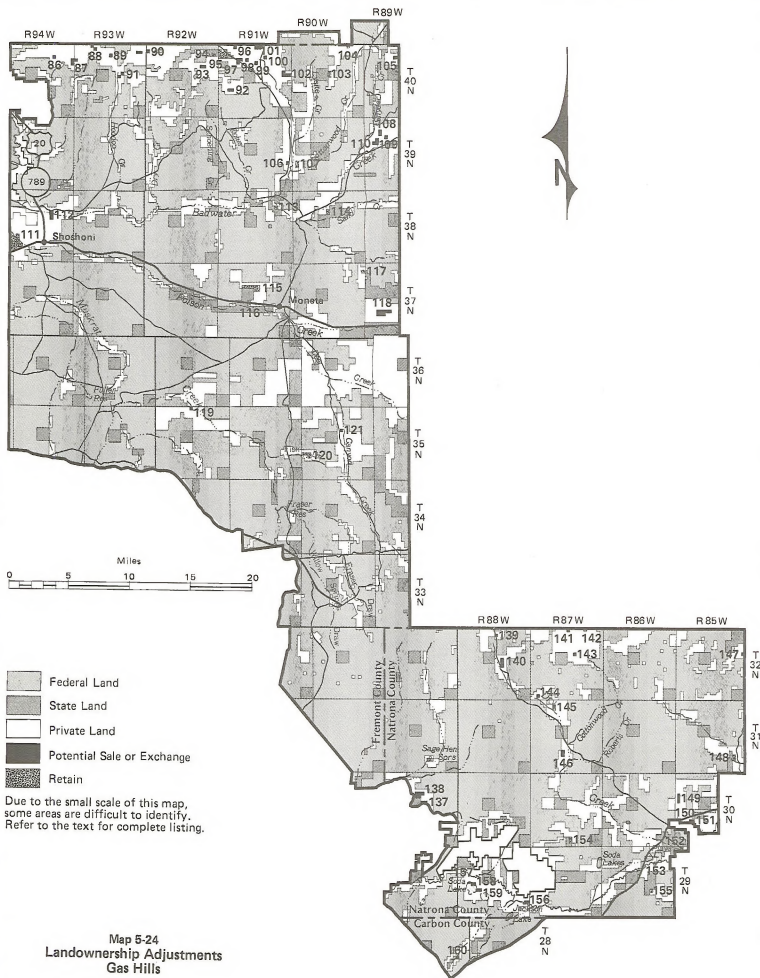
The preferred alternative also includes allowing major utilities in the area, except for along the Oregon Trail corridor and Sweetwater Rocks. Rights-of-way for major utility systems might be granted if no feasible alternative route or designated right-of-way corridor were available. Utility systems would be concentrated in existing corridors whenever possible. The rationale for this alternative is that there would be no significant impact resulting from major utility systems, especially when located in existing corridors and outside the two high resource value, avoidance areas identified above.

### Recreation

The preferred alternative would maintain existing BLM developments at the Devil's Gate interpretive site and Castle Gardens picnic site.

The Devil's Gate interpretive site is incorporated in the management plan for the Oregon/Mormon Trail. The plan provides detailed planning with specific objectives for use by visitors, resource protection, and interpretive needs consistent with public demand. Castle Gardens is an extensive recreation management area and, as with the rest of the Gas Hills unit, dispersed recreation would be encouraged. Other than additional interpretation and resource protection at Castle Gardens,







## Preferred Alternative/Plan

recreation management and maintenance would be minimal, with emphasis on resolving user conflicts and providing resource protection.

### Off-Road Vehicles (ORVs)

The preferred alternative would limit ORV use to existing roads and vehicle routes, except for the Castle Gardens withdrawal area, which would be closed to ORV use.

An ORV designation of "limited to existing roads and vehicle routes" is determined to be appropriate for the majority of the public lands by accommodating access needs while providing resource protection. An ORV closure on the 80-acre protective withdrawal area at Castle Gardens would protect fragile soils, rock outcrops and Class A scenery. The BLM road to the picnic site would remain open in the closed ORV area.

### Cultural/Natural History

The preferred alternative for the cultural/natural history program in the Gas Hills Management Unit would affect two significant cultural resources. It would ensure that all actions are consistent with the Oregon-Mormon National Historic Trail Management Plan (in preparation) and would provide for a management plan that would include provisions for walkways and further fencing at the Castle Gardens rock art site.

The Oregon-Mormon Trail Management Plan (described in Chapter II) would establish protection, use, and management guidelines for public land trail resources throughout Wyoming, including the Lander Resource Area. Draft recommendations now formulated for the trail would establish the following in the Gas Hills Management Unit: a ¼ mile or visible horizon corridor (whichever is closer) on each side of selected trail segments where modern intrusions and disturbances would be minimized or prohibited, a protective withdrawal for the Martin's Cove National Register Site, and a continuation of the protective withdrawal at the Devil's Gate Historic Landmark and fragile lands along the Oregon/Mormon Trail. Adoption of these recommendations in the RMP would provide continued protection of this National Historic Trail and two of its highly important sites. This type of management would ensure compliance with National Trails System Act requirements for the protection of important trail segments and sites, as well as provide for the preservation of several National Register listed and eligible trail

properties. It would also continue long-standing past efforts of BLM to preserve and encourage public enjoyment of the trail.

Development of a management plan would provide for a well planned framework to guide activities within the Castle Gardens rock art site. The plan would include installation of walkways and extra protective fencing at Castle Gardens, which would help halt deterioration of a regionally significant prehistoric rock art site. This National Register enrolled site, which the BLM has developed as an interpretive site, is suffering impacts from erosion caused by human traffic on the site and from defacing of the rock art by vandals. Positive action to prevent these impacts would help protect the rock art site and its surroundings. No action could result in adverse effects to the site and diminish the value of BLM's prior investments at the site.

### Fire Management

The Gas Hills Management Unit has been divided into three suppression zones (see map 5-25). Each zone and its corresponding preferred alternative are as follows:

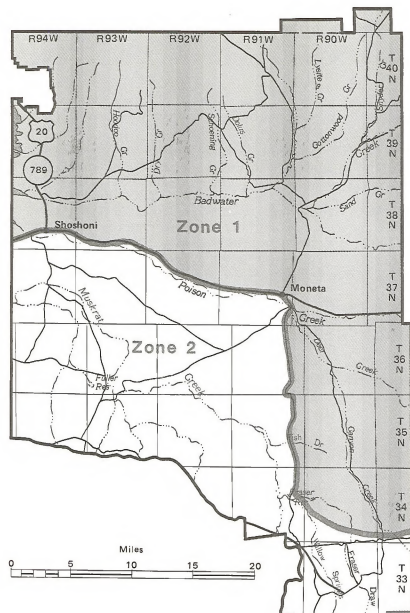
#### Zone 1

Full suppression with limited use of heavy equipment is the preferred alternative for this zone. This would mean an aggressive initial attack with all available resources, with the exception of heavy equipment such as bulldozers. If the fire were not controlled during initial attack, a decision would be made whether or not to use heavy equipment, based on the escaped fire analysis.

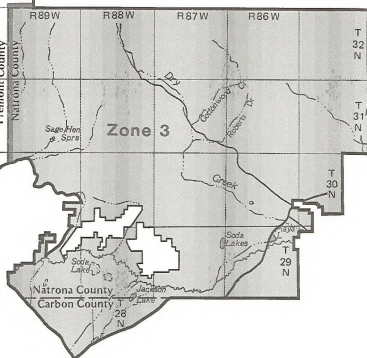
There are many areas within this zone where wildfires could be safely managed without full suppression. However, there are large areas of intermingled private lands where it would be difficult, under certain circumstances, to limit wildfires to public lands. There is also big game winter range that could be damaged by uncontrolled wildfires.

#### Zone 2

Limited suppression was chosen as the preferred alternative for this zone. The primary objective of this type of management is to reduce suppression costs in contrast to damages the fire would have caused. A fire in this area would be observed and suppression would occur when the fire: 1) exceeds or has the potential to exceed



- Full suppression with no heavy equipment on initial attack; prescribed burns allowed.
- Limited suppression; prescribed burns allowed.



Map 5-25  
Fire Suppression Zones  
Gas Hills

## Preferred Alternative/Plan

the size specified in a predetermined plan, 2) threatens private property, 3) threatens other man-made structures, or 4) threatens human life.

This area has a history of fires on an average of one every 3 years. There is a very small amount of intermingled private lands. The resource damage caused by wildfires is less than the damage that would be created by fire-fighting equipment and people. Also, the use of limited suppression is less costly than full suppression.

### **Zone 3**

Full suppression with limited use of heavy equipment was chosen as the preferred alternative for this zone. This would mean an aggressive initial attack on all wildfires with all available resources, with the exception of heavy equipment such as bulldozers. If the fire were not controlled after the initial attack, a decision based on the escaped fire analysis would be made as to whether or not to allow the use of heavy equipment.

Full suppression was chosen, even though there are many areas where wildfires could enhance range and wildlife habitat, because of the large amount of private and state lands that could be damaged as a result of wildfire started on BLM-administered lands. Prescribed burns would be used for range and wildlife habitat improvement.

### **Access**

The preferred alternative to negotiate with landowners for administrative access as identified in the District Transportation Plan. As of 1985, this plan calls for negotiating easements on the Copper Mountain Road.

The county road system provides adequate public access for the Gas Hills Management Unit. BLM would continue to maintain the Castle Gardens access road. Easements for administrative access on Copper Mountain are needed to maintain BLM's radio repeater site on state land.

## **East Fork Management Unit**

The East Fork Management Unit contains about 950 acres of BLM-administered surface, 3,400 acres of BLM-administered lands that are dedicated as Wildlife Coordination lands, 14,000 acres of federal mineral estate, and 12,000 acres of state lands. There are 8 mining claims in this

unit. These claims are primarily for precious metals and lie along the fringe of the big game winter range.

The East Fork big game winter range is one of the most outstanding managed elk winter ranges in the West. As many as 3,500 elk winter on the 17,000 acres in this unit (approximately 1,000 acres are administered by BLM). East Fork was established as a winter range for elk in 1947, because the elk were threatening the livelihood of ranchers in the area. In 1972, BLM entered into a cooperative management agreement with the state of Wyoming that committed BLM to: 1) not issue livestock grazing leases in the unit, and 2) to manage the area as an elk winter range requiring other public uses to be compatible with that purpose.

The unit has moderate development potential for oil and gas and low potential for other mineral resources. As of December 1981, BLM had issued oil and gas leases on about 4,000 acres, and the state of Wyoming had issued oil and gas leases on another 600 acres of state lands within the unit.

## **Energy and Minerals**

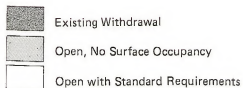
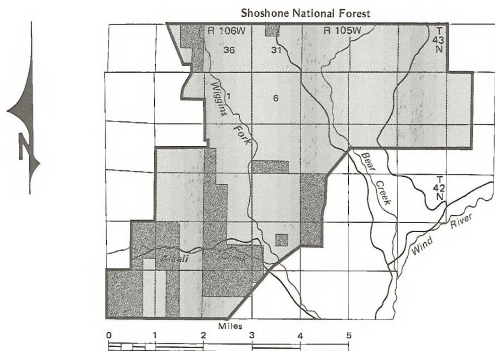
### **Oil and Gas**

The preferred alternative for management of the East Fork Management Unit is to issue oil and gas leases with no surface occupancy restrictions (see map 5-26).

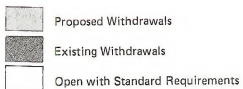
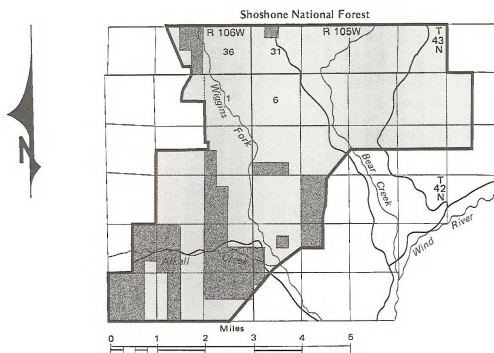
The preferred alternative would be consistent with cooperative management efforts of the Wyoming Game and Fish Department, U.S. Fish and Wildlife Service and the Bureau of Land Management to manage the area as an elk winter range. The federal mineral estate within the unit has been rated as having low to moderate potential for the occurrence of oil and gas.

### **Locatable Minerals**

The preferred alternative for management of the East Fork Management Unit would include closing approximately 13,855 acres of federal mineral estate to locatable mineral exploration and development (see map 5-27). By Public Land Order 888 (March 30, 1953) and Public Land Order 4644 (April 18, 1969), 3,432 acres were withdrawn from appropriations under the mining laws and made available for use as a crucial winter range for elk. These lands are controlled by the Wyoming Game and Fish Department through a cooperative



Map 5-26  
Oil and Gas Leasing Decisions  
East Fork



Map 5-27  
Locatable Minerals  
East Fork

## Preferred Alternative/Plan

agreement with the U.S. Fish and Wildlife Service under the provisions of the Coordination Act (60 Stat. 1080, U.S.C. 661-666 c). Implementation of this alternative would require the withdrawal of approximately 10,423 acres of federal mineral estate from appropriations under the mining laws.

The preferred alternative would be consistent with cooperative management efforts of the Wyoming Game and Fish Department, U.S. Fish and Wildlife Service and the Bureau of Land Management to manage the area as an elk winter range.

### Fish and Wildlife

The preferred alternative for the East Fork Management Unit is to continue cooperative habitat improvement projects developed with the Wyoming Game and Fish Department. These would include a variety of actions such as prescribed burning or other cultural practices, seeding, pitting, herbicide treatment, water development, etc. Any projects initiated would be designed to improve habitat for wintering elk, the priority species on the unit, or to benefit other species if the project would not cause significant negative effects on the elk population. Projects that would benefit elk, but that would also have significant negative effects on other important species, probably would not be undertaken.

This alternative was selected because any habitat improvement action taken under it would be consistent with the Wyoming Game and Fish Department's management objectives for the East Fork Big Game Winter Range and, therefore, with Wyoming Game and Fish Department/Bureau of Land Management cooperative agreements and the Public Land Orders effecting the unit.

### Landownership Adjustments and Utility Systems

The preferred alternative includes retaining tracts 24, 25, 26 and 27, totaling approximately 881 acres, in public ownership. The tracts would be considered for disposal (exchange or sale) only to public agencies or private organizations which would use the lands in a manner consistent with the management objectives of the East Fork elk winter range (see map 5-28). Proposals for disposal or exchange received in the future would

be considered on a case-by-case basis. If a certain proposal is determined to be consistent with the objectives of this RMP, it could be approved without preparing a planning amendment. The rationale for the preferred alternative is that the lands are an integral part of the East Fork Big Game Winter Range and the disposal of these lands for other than the two agencies would be detrimental to the management of this regionally important elk winter range. The lands are also high-value recreational lands and should, therefore, remain in public ownership.

The preferred alternative also includes issuing Recreation and Public Purpose Act patents on a case-by-case basis. The preferred alternative additionally provides for avoiding the area when locating major utility systems. Rights-of-way for major utility systems might be granted if no feasible alternative route or designated right-of-way corridor were available.

### Recreation Management

The East Fork Management Unit requires minimal management for recreation. Emphasis would be on resolving user conflicts and providing resource protection.

### Off-Road Vehicles (ORVs)

The preferred alternative is to limit vehicular traffic to existing roads and vehicle routes. This designation provides adequate resource protection, while accommodating access needs.

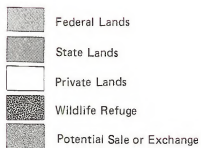
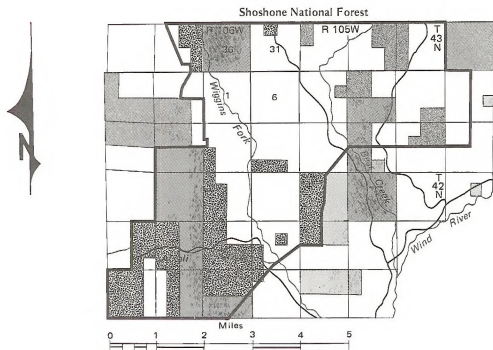
### Fire Management

Full suppression was chosen as the preferred alternative for the East Fork Management Unit. This would entail an aggressive initial attack with all available resources, with the objective of suppressing wildfires as quickly as possible.

This area is an established winter range for elk and other big game species. The destruction of a large portion of this winter range by uncontrolled fires would force the animals onto adjacent private lands, thus causing serious conflicts between the elk herd and livestock grazing.

The area is also under the cooperative agreement for initial suppression with the U.S. Forest Service.





Map 5-28  
Landownership Adjustments  
East Fork

## Preferred Alternative/Plan

### Access

The preferred alternative is to maintain the existing transportation system. Adequate public access is available to public lands in the East Fork Management Unit.

### Dubois Badlands Management Unit

The Dubois Badlands Management Unit contains about 5,000 acres of BLM-administered surface, 11,000 acres of federal mineral estate, and 6,600 acres of state and private lands. There are no mining claims within the Dubois Badlands Management Unit.

This management unit contains 4,500 acres of highly eroded badland topography banded by red, gray and white clay soils. The unit provides important habitat for bighorn sheep, elk, deer, and antelope. This area has moderate potential for occurrence of oil and gas. It is unknown if there is any potential for other minerals.

The Dubois Badlands unit was a wilderness study area until December 30, 1982, when the Secretary of Interior dropped all wilderness study areas under 5,000 acres in size from further consideration for wilderness. During the writing of the RMP, this decision was reversed. (For more details on how this issue will be addressed, see Chapter II, Management Actions Common to All Alternatives.)

### Energy and Minerals

#### Oil and Gas

The preferred alternative for management of the Dubois Badlands would include keeping the entire unit open to oil and gas leasing, with restrictions to protect significant surface resource values. This would include applying a no surface occupancy restriction to all new oil and gas leases issued on 4,500 acres, which has moderate potential for the occurrence of oil and gas. These 4,500 acres were previously included in the Dubois Badlands WSA. No-surface-occupancy restrictions would be applied to new leases throughout the remainder of the management unit to protect water quality, fisheries, riparian areas, sage grouse leks, steep slopes, threatened and endangered species, and significant cultural resources. In addition,

exploration activities would be seasonally restricted in crucial wildlife habitat areas (see Appendix 2 for these restrictive measures).

The preferred alternative provides for the protection of the natural and visual characteristics of the Dubois Badlands area as well as crucial wildlife habitats and fragile areas, while providing opportunities to explore for and develop the oil and gas reserves within the management unit (see map 5-29).

#### Locatable Minerals

Under the preferred alternative, the entire management unit would be open for exploration and development of locatable minerals. In addition, a plan of operations would be required for all locatable mineral exploration and development operations conducted within that portion of the unit previously included within the Dubois Badlands WSA (see map 5-30 and the discussion on ACECs at the beginning of this chapter).

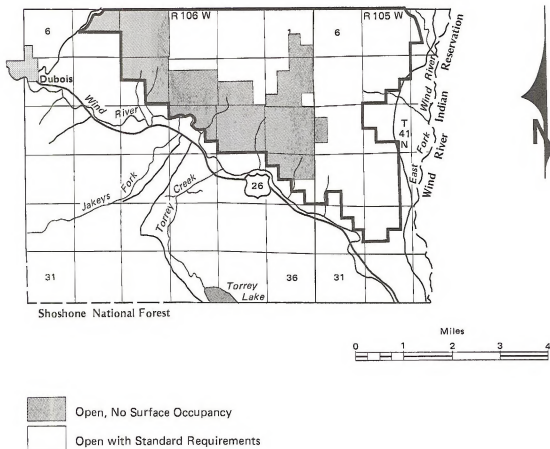
Because of the limited interest that has been expressed for locatable mineral exploration activities and the low development potential in this area, adequate protection of significant surface resources could be achieved through the approval process for the plans of operations that would be required for all locatable mineral exploration and development activities.

#### Fish and Wildlife

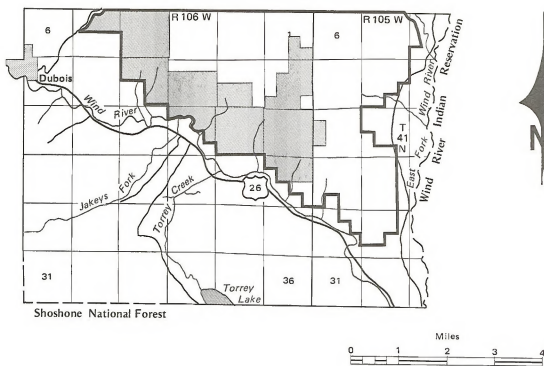
Under the preferred alternative, routine fish and wildlife habitat improvement projects and maintenance of existing projects would be completed after appropriate review and would be consistent with program capabilities and priorities.

#### Landownership Adjustments and Utility Systems

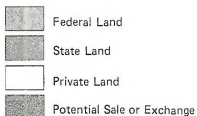
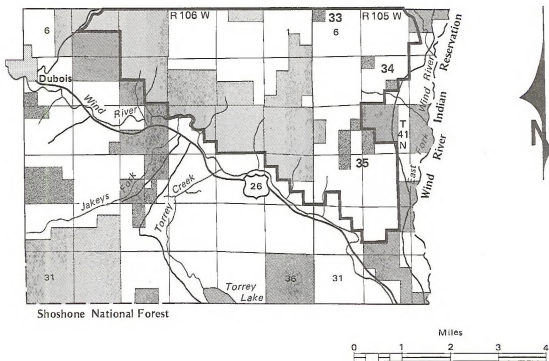
The preferred alternative is to dispose of three small isolated parcels (33, 34 and 35) of public land, which total approximately 359 acres (see map 5-31). Exchange is the preferred method of disposal. Proposals for disposal or exchange received in the future would be considered on a case-by-case basis. If a certain proposal is determined to be consistent with the objectives of this RMP, it could be approved without preparing a planning amendment.



Map 5-29  
Oil and Gas Leasing Decisions  
Dubois Badlands



Map 5-30  
Locatable Minerals  
Dubois Badlands



Map 5-31  
Landownership Adjustments  
Dubois Badlands

## Preferred Alternative/Plan

These parcels have crucial and important wildlife values for elk, deer, and bighorn sheep, and the public views these lands in this unit as being valuable for wildlife. However, these tracts are small and quite isolated from the remaining public lands in this unit and there is no legal access for management purposes. It is not likely that the existing land use, livestock grazing and wildlife habitat, would change if the lands were exchanged. This assumption is based on the lack of access and the fact that the surrounding landowners (livestock operators) would have the first opportunity to purchase the parcels, if sold.

The preferred alternative is to issue Recreation and Public Purpose Act patents on a case-by-case basis. The rationale for this alternative is that R&PP patents would be analyzed in response to applications, and decisions as to compatibility with the unit's resource values would be considered at that time.

The preferred alternative includes avoiding the Dubois Badlands when routing major utility systems. Rights-of-way might be granted if no feasible alternative route or designated right-of-way corridor were available. Rationale for this alternative is that the scenic, watershed and wildlife habitat values of the Dubois Badlands would be protected.

### Recreation

The Dubois Badlands is an extensive recreation management area that would be managed in its natural state. Recreation management would emphasize resolving competing uses and providing resource protection.

### Off-Road Vehicles (ORVs)

The preferred alternative is to close the entire unit to ORV use. A closure would protect outstanding scenery and natural values. There is strong public support for eliminating ORV damage to the fragile soils, visual resources and significant wildlife habitat.

### Fire Management

The preferred alternative for the Dubois Badlands Management Unit is limited suppression. This alternative was selected because the occurrence of wildfire is low and because fire-fighting activities would disturb the very fragile soils in the area. Limited suppression would also help protect the area's natural values.

### Access

The preferred alternative would provide for maintenance of the existing transportation system. Present public access is adequate.

## Whiskey Mountain Management Unit

The Whiskey Mountain Management Unit contains about 4,000 acres of BLM-administered surface, 8,000 acres of federal mineral estate, and 6,000 acres of state and private lands. There are no mining claims on Whiskey Mountain.

Whiskey Mountain is a bighorn sheep crucial winter range managed jointly by the U.S. Forest Service, state of Wyoming, and BLM. The unit has low potential for occurrence of oil and gas and other minerals, and no leases have been issued. A portion of the Whiskey Mountain Unit (500 acres) was also a wilderness study area until December 30, 1982. During the writing of the RMP, the decision to drop this area from further consideration for wilderness was reversed. (For more details on how this wilderness issue will be addressed, see Chapter II, Management Actions Common to All Alternatives.)

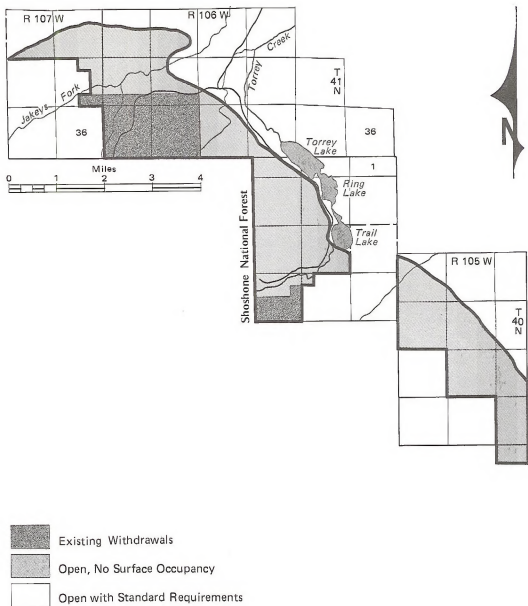
### Energy and Minerals

#### Oil and Gas

The preferred alternative for management of the Whiskey Mountain Management Unit would include issuing oil and gas leases with no surface occupancy restrictions (see map 5-32). Of the 6,630 acres of federal mineral estate within the management unit, 2,599 acres are currently segregated from appropriations under the mineral leasing laws.

The preferred alternative would be consistent with cooperative management efforts of the Wyoming Game and Fish Department, U.S. Forest Service and Bureau of Land Management to manage the Whiskey Mountain Bighorn Sheep Winter Range for the purpose of perpetuating the bighorn sheep herd for sport hunting, aesthetics, transplant stock, and educational and scientific values. The overall management strategy, as set forth by this cooperative agreement, implemented in July 1969, is to protect and enhance the value of the range for bighorn sheep and for other values





Map 5-32  
Oil and Gas Leasing Decisions  
Whiskey Mountain

## Preferred Alternative/Plan

"compatible therewith" in the best interests of the public.

All of the land within the Whiskey Mountain Management Unit has been rated low for the potential occurrence of oil and gas.

### Locatable Minerals

The preferred alternative for management of the Whiskey Mountain Management Unit would include closing the Whiskey Mountain Bighorn Sheep Winter Range to locatable mineral exploration and development (see map 5-33).

Of the 6,630 acres of federal mineral estate within the management unit, 2,599 acres are currently segregated from appropriations under the mining laws. Implementation of this alternative would require the withdrawal of all 6,630 acres of federal mineral estate from appropriation under the mining laws (except for oil and gas).

The preferred alternative for locatable minerals would be consistent with cooperative management efforts of the Wyoming Game and Fish Department, U.S. Forest Service, and Bureau of Land Management.

### Fish and Wildlife

All of the habitat and animal management techniques and improvement projects referred to in this alternative would be initiated for the direct or indirect benefit of the Whiskey Mountain bighorn sheep and their habitat (see Alternative A, Fish and Wildlife, Whiskey Mountain, Appendix I).

Habitat improvement such as vegetative manipulation or prescribed burning could be used to improve habitat for elk, mule deer or other species, if the purpose were to reduce the competition of these animals with bighorns or if the project would benefit mule deer, elk, etc., without causing significant negative effects on bighorn sheep.

This alternative was selected because it is consistent with the 1969 Interagency Cooperative Agreement, the Whiskey Mountain Bighorn Sheep Comprehensive Management Plan, and the long-standing and established purpose of the Whiskey Mountain Bighorn Sheep Winter Range, all of which emphasize the priority of bighorns and their habitat. Successful implementation of these projects and programs would have significant

beneficial effects on bighorn sheep and their habitat.

### Landownership Adjustments and Utility Systems

The preferred alternative would allow landownership adjustments only when the Bighorn Sheep Interagency Technical Committee has analyzed and recommended such adjustments. The Bighorn Sheep Interagency Technical Committee would take an active role in pursuing and reviewing landownership adjustment options. The rationale for this alternative is that if the 2 parcels identified for possible disposal (Nos. 38 and 163 totalling 890 acres) were to be disposed of, the end result must be a net benefit to management of the bighorn sheep habitat (see map 5-34).

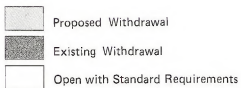
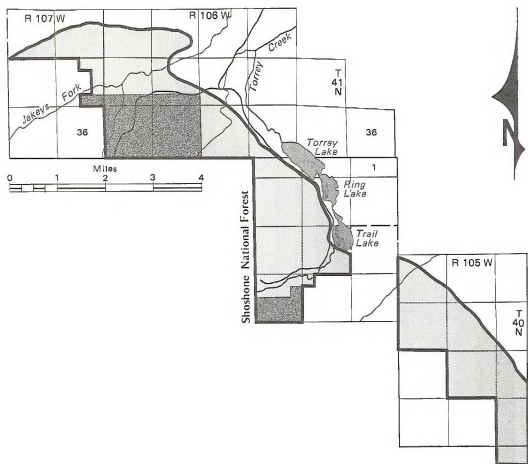
Proposals for disposal or exchange received in the future would be considered on a case-by-case basis. If a certain proposal is determined to be consistent with the objectives of this RMP, it could be approved without preparing a planning amendment.

The preferred alternative also states that Recreation and Public Purpose Act patents will be issued on a case-by-case basis. The rationale for this alternative is that R&PP actions would be analyzed in response to applications, and decisions as to compatibility with the unit's resource values would be considered at that time.

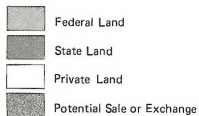
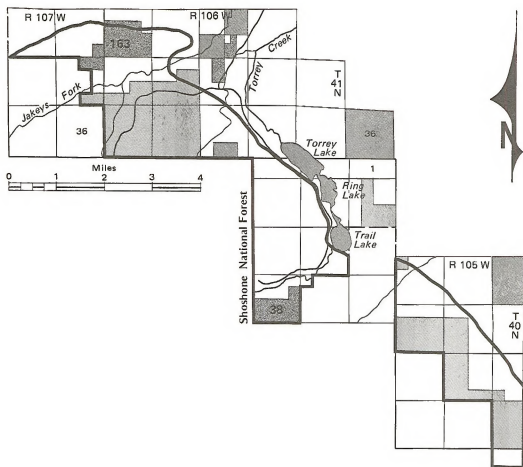
The preferred alternative additionally provides for avoiding the management unit when locating major utility systems. Rights-of-way might be granted if no feasible alternative route or designated right-of-way corridor were available. The rationale is that installation and maintenance activities could adversely impact both bighorn sheep and their habitat. The management unit is located quite high on the slopes of the Wind River Mountains in an area not conducive to constructing major utility systems.

### Recreation Management

The preferred alternative is to cooperate with the Wyoming Game and Fish Department on nonconsumptive wildlife visitor use management, set a 14-day camping limit and exclude commercial hunting camps, which would not be compatible with management of the bighorn sheep herd.



Map 5-33  
Locatable Minerals  
Whiskey Mountain



Map 5-34  
Landownership Adjustments  
Whiskey Mountain

## Preferred Alternative/Plan

### Off-Road Vehicles (ORVs)

The preferred alternative would limit vehicle use to designated roads and vehicle routes and impose seasonal closures in some areas. A few roads would be rehabilitated, while others would remain open for viewing the bighorn sheep.

Long- and short-term resource damage, user access requirements and public safety suggest that limitation of ORV use would be in the best public interest. Roads and vehicle routes should be closed seasonally in order to protect the roadbed, watershed values, visual resources, and wildlife habitat (approximate dates would be from December 1 to June 15). Unnecessary roads would be eliminated to put areas back into production for wildlife habitat.

### Fire Management

The preferred alternative for the Whiskey Mountain Management Unit is full suppression. This would entail aggressive initial attack, utilizing all available resources, with no restrictions on equipment use. The objective would be to control and suppress wildfires as quickly as possible.

This area contains large acreages of crucial winter range for big game herds that could be severely damaged by uncontrolled fires. The area also contains heavy fuels, which could create very intense fires that could severely damage habitat on BLM lands and on adjacent state, private and U.S. Forest Service lands.

This area is also under a cooperative protective agreement for initial attack with the U.S. Forest Service. An equipment restriction on initial attack could complicate fire management on the area by limiting the types of equipment and fire-fighting methods.

### Access

The preferred alternative is to maintain the present transportation system. Legal public access is available to public lands in the Whiskey Mountain Management Unit.

### Dubois Area Management Unit

The Dubois Area Management Unit contains about 27,000 acres of BLM-administered surface,

84,000 acres of federal mineral estate, and 103,000 acres of state and private lands.

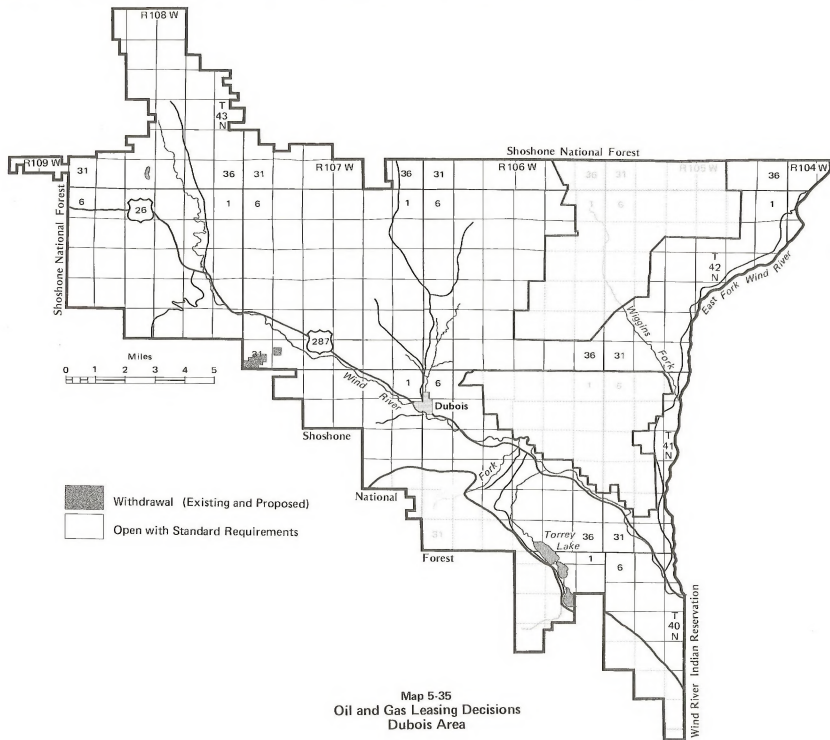
The Dubois Area Management Unit consists of scattered public lands with potential for occurrence of oil and gas, ranging from mostly low to some moderate and some high. This scenic unit also has important habitats for elk, deer, moose, and antelope.

### Energy and Minerals

#### Oil and Gas

The preferred alternative for management of the Dubois Area Management Unit would include keeping the entire unit open for oil and gas leasing. New oil and gas leases issued in areas rated as having moderate, low or no potential for the occurrence of oil and gas reserves would include a no-surface occupancy restriction to protect water quality, fisheries, riparian areas, sage grouse leks, steep slopes, threatened and endangered species, Warm Springs Canyon, the area around Torrey Lake, and significant cultural sites. In addition, seasonal restrictions would be applied to the leases to protect crucial wildlife habitat areas. In areas with moderate, low or no potential for occurrence of oil or gas, restrictions would be applied automatically before lease issuance. These restrictions could be waived later if appropriate. In areas with high potential for the occurrence of oil or gas, including KGSs, restrictions would not be automatically applied before lease issuance. Instead, new oil and gas leases issued in these areas would be conditioned with no-surface occupancy and seasonal restrictions on a case-by-case basis and only when necessary to avoid a significant adverse impact on another resource. This alternative would further provide for the enhancement of oil and gas development in KGSs and high-potential areas through the waiver of lease restrictions, upon demonstration by the lessee that adverse impacts to other resources could be minimized (see map 5-35).

Implementation of the preferred alternative would allow for maximum management flexibility over the full range of resources. In areas of moderate, low and no potential for occurrence of oil and gas, this alternative would allow for enhanced management of the surface resources, while providing opportunities for exploration and development of the oil and gas reserves. Conversely, in areas of high potential for the occurrence of oil and gas or in areas of established production such as KGSs, this alternative would





## Preferred Alternative/Plan

allow for enhanced management of exploration and development activities by minimizing the restrictions imposed on these activities.

### Locatable Minerals

The entire unit, with the exception of 190 acres in the Warm Springs Canyon, would be open to locatable mineral exploration and development. All exploration and development activities would be regulated in accordance with the regulations set forth in Title 43 CFR Part 3809. Implementation of this alternative would require the withdrawal of 190 acres of federal mineral estate from appropriation under the mining laws (see map 5-36). Because of the limited interest that has been expressed for locatable mineral exploration activities and the relatively low development potential of the area, adequate protection for other resources could be achieved through administration of all exploration and development activities under the regulations contained in the Title 43 CFR Part 3809, with the exception of 190 acres in Warm Springs Canyon. Withdrawal of the 190 acres would be consistent with the management objective of protection of the scenic, natural and historical characteristics of the canyon.

### Fish and Wildlife

Under the preferred alternative, routine fish and wildlife habitat improvement projects and maintenance of existing projects would be completed after appropriate review and would be consistent with program capabilities and priorities.

### Forest Management

The preferred alternative would be to offer small sales if a demand existed. The objective would be to improve the condition of the timber on small areas by regenerating harvested areas. This would be mainly to benefit wildlife habitat in these areas.

Timber resources in the Dubois Area Management Unit are quite limited; therefore, opportunity for timber harvest is also quite limited. There are only 2,000 acres of timber stands scattered over this area, with the majority in the Sand Butte and Hat Butte areas.

Physical access to the timber stands is difficult because of the rough terrain, but could be accomplished from at least two different

directions. Legal access through private lands is lacking; however, this should not be a problem if negotiated sales were utilized.

### Landownership Adjustments and Utility Systems

The preferred alternative is to retain 13 tracts and consider 17 tracts for sale or exchange (see map 5-37). Proposals for disposal or exchange received in the future would be considered on a case-by-case basis. If a certain proposal is determined to be consistent with the objectives of this RMP, it could be approved without preparing a planning amendment.

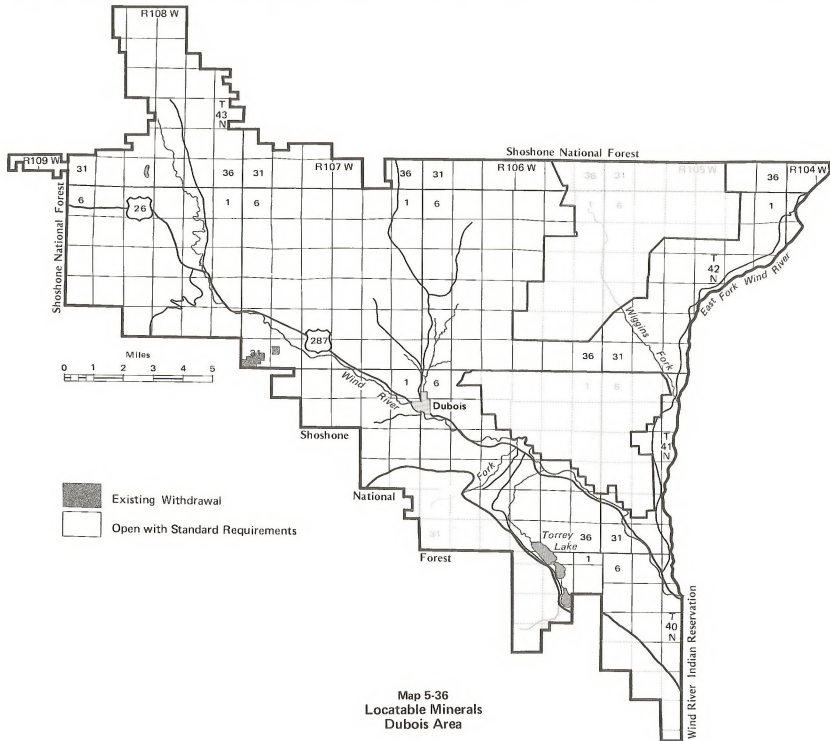
The 14 tracts, totaling approximately 2,960 acres (tracts 2, 3, 6, 9, 10, 12, 13, 15, 18, 19, 29, 31, 36, and 162) would be retained because of important wildlife habitat and high public recreational values. The other 17 tracts, totaling approximately 2,285 acres (tracts 1, 4, 5, 7, 8, 11, 14, 16, 17, 20, 21, 22, 23, 28, 30, 32 and 37), would be sold or exchanged. The rationale for disposal of these tracts is that even though they have high wildlife values, there is no legal or physical access to these lands. It is predicted that the wildlife habitat value of these parcels would not be affected if they were disposed of, because a change in land use would probably not occur.

Recreation and Public Purpose Act patents would be issued on a case-by-case basis to meet the needs of organizations and local and state governments.

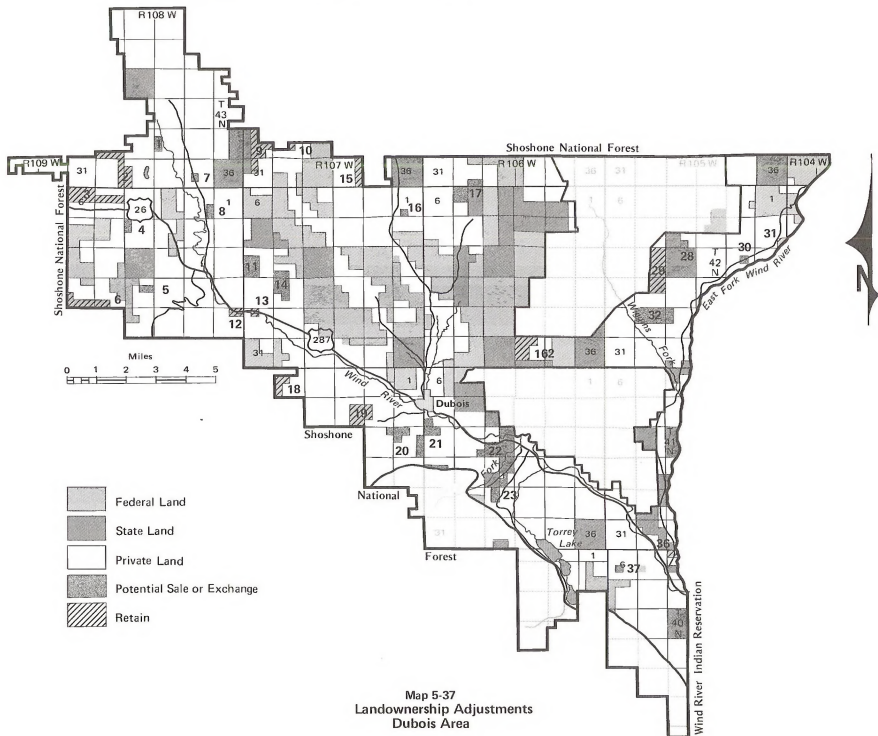
The preferred alternative would also allow major utility systems. The systems would be concentrated in existing corridors whenever possible. The rationale is that the potential routes that are suitable for locating major utility systems are located along U.S. Highway 287, county roads, and major drainages. These areas are comprised of predominantly private land, with scattered small parcels of public land that would not be significantly impacted by a major utility system.

### Recreation Management

This unit would best be managed consistently with other extensive recreation management area objectives where dispersed recreation would be encouraged and where visitors would have freedom of recreational choice with minimal regulation.



Map 5-36  
Locatable Minerals  
Dubois Area



## Preferred Alternative/Plan

### Off-Road Vehicles (ORVs)

The preferred alternative would limit ORV use to existing roads and vehicle routes.

ORV use is limited to existing roads and vehicle routes on most public lands. There is still ample opportunity to leave existing roads to perform necessary tasks, including picking up big game kills, repairing range improvements, managing livestock, and performing mineral activities with minimal surface disturbance.

### Cultural/Natural History

The preferred alternative for the cultural/natural history resources program in the Dubois Area Management Unit would affect one combined cultural/natural history resource. It would provide for the completion of a management plan for the Warm Springs Canyon flume, following a study of stabilization needs of the flume.

A study detailing the stabilization needs of the flume and an overall management plan for Warm Springs Canyon would begin the process of protecting the important cultural and natural history resources of the canyon from deterioration. This flume, which is eligible for the National Register, is presently suffering from natural weathering and minor vandalism, but still remains in fair shape overall. Continued neglect of the flume would eventually result in the destruction of this important resource, although it does not appear to be in immediate danger. The natural bridge and geyser are less vulnerable, but still are in some danger of damage from vandalism. For these reasons, a management plan designed to manage the canyon and assess stabilization and protection needs for the flume was chosen.

### Fire Management

The preferred alternative for this area is full suppression with no equipment restrictions. This entails an aggressive initial attack with all available resources, with the objective of suppressing wildfires as quickly as possible.

The BLM-administered lands in this area are very scattered, with more private and state lands than BLM lands. Full suppression would reduce or eliminate damage to other lands from wildfires starting on BLM lands.

### Access

The preferred alternative provides for negotiations with landowners for easements as identified in the District Transportation Plan. As of 1985, this plan calls for negotiating easements for public access on the Tappan Creek Road.

The Tappan Creek Road is not available for public access. The public lands in the management unit are largely land-locked. Easements on this road would provide public access to several hundred acres of public land and would tie into the national forest land. Legal access would provide important access for hunting and sightseeing.

### Sweetwater Canyon Management Unit (Wilderness Study Area)

The preferred alternative for the Sweetwater Canyon Wilderness Study Area is partial wilderness. The wilderness study area originally contained 9,056 acres, but under the preferred alternative, the wilderness acreage would include 5,760 acres. Specific management actions are described in the Wilderness Supplement. There are several reasons for selecting the preferred alternative. One is that the area meets the criteria for wilderness and is manageable for wilderness because the physical aspect of the canyon naturally restricts vehicles and limits travel to hiking or horseback. Managing the area for wilderness would not result in a tradeoff of other high-value resources. Partial wilderness resulted in the study area being reduced to the river canyon proper, which aids manageability. The present road use to the top edge of the canyon would not be restricted, and the river canyon setting would remain protected.

### Sweetwater Rocks Management Unit (Wilderness Study Area)

The preferred alternative for the Sweetwater Rocks Wilderness Study Area is continuation of present multiple-use management. Specific management actions are described in the Wilderness Supplement. The Sweetwater Rocks Management Unit, 32,175 acres, contains four wilderness study areas. The rationale for the preferred alternative relates to the landownership

## Preferred Alternative/Plan

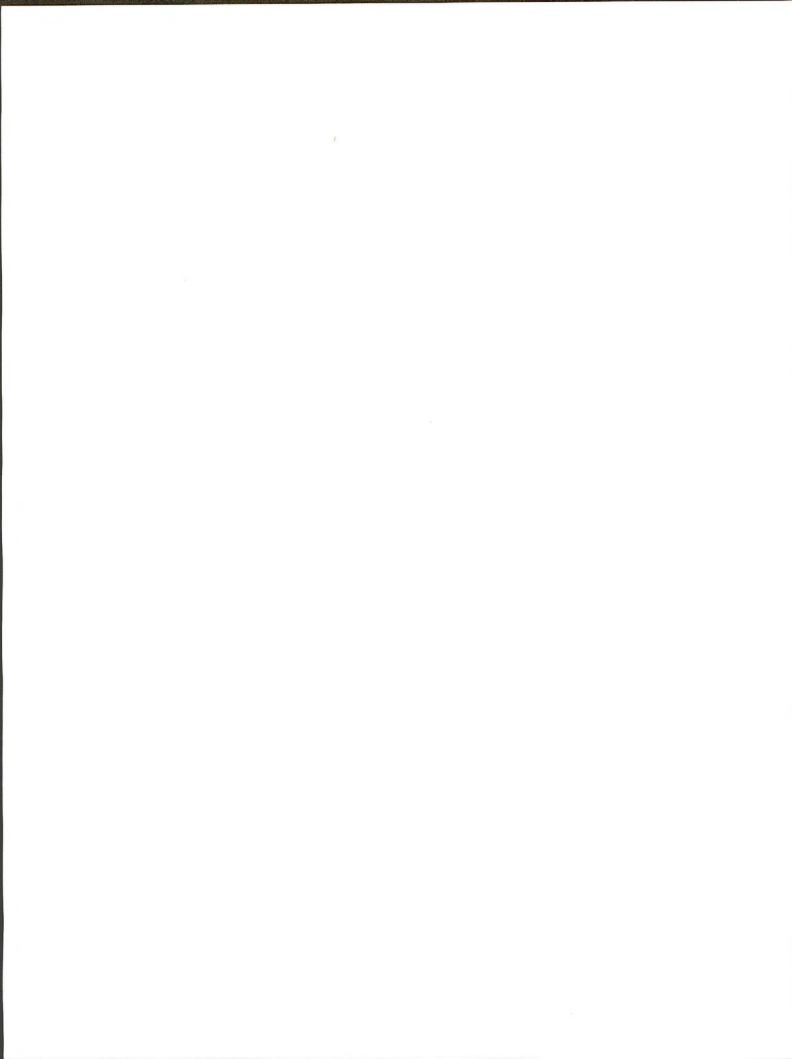
pattern, because managing this area as wilderness could not be done without negatively impacting the management of the six adjoining ranches. Existing access routes cross the surrounding private lands, which could lead to trespass on those lands and require additional time and effort to manage people (e.g., requests for permission to use or cross private lands, controlling trespass, etc.)

There should be no significant impacts from not designating the area as wilderness.

The area could be managed in its existing unintruded setting by not allowing the location of major utility systems, not developing recreational sites, and not improving or upgrading roads. There is no foreseeable mineral development potential, and recreational opportunities would remain, even in nonwilderness status.

## Copper Mountain Management Unit (Wilderness Study Area)

The preferred alternative for the Copper Mountain Wilderness Study Area is continuation of the present multiple-use management. Specific management actions are described in the Wilderness Supplement. The rationale for the preferred alternative is that the area has high and moderate potential for oil and gas resources that could not be developed if the area were managed as wilderness. In addition, the noise emanating from truck traffic in the adjacent Wind River Canyon severely reduces the opportunities for solitude.





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## CHAPTER VI

# CONSULTATION AND COORDINATION

## INTRODUCTION

The Lander RMP/EIS was prepared by an interdisciplinary team of specialists from the Lander Resource Area and the Rawlins District office and the Wyoming State office of BLM. In-depth reviews for accuracy and consistency were provided by both the district office and state office staffs.

Consultation, coordination and public involvement have occurred throughout the process through scoping meetings, open house and informal meetings, individual contacts, a newsletter, radio and newspaper releases, and Federal Register notices.

Writing of the document began in the fall of 1984. Much of the analysis, research, inventory, public involvement, and interagency coordination was done before that time.

## PUBLIC PARTICIPATION

A public participation plan was prepared to ensure that the public would have numerous opportunities to be actively involved in the planning and environmental processes. Both formal and informal input have been encouraged and utilized.

A *Federal Register* notice of intent to prepare a plan was published in January 1984. A news release on October 24, 1984, announced four open house meetings to be held in November. At the same time, a newsletter, requesting public input that outlined planning issues and criteria, was mailed to agencies, organizations and individuals on our mailing list.

The responses received were from many sectors of the public and covered all the issues and proposed management actions. Generally, there was a great deal of interest in the wilderness study areas, by both development and preservation-oriented entities and individuals. Many responses dealt with oil and gas and other mineral issues and concerns not only in the wilderness study areas, but in the other management units as well. There was considerable interest, by ranchers primarily, in the grazing proposals. There were

many comments dealing with wildlife preservation and enhancement, especially regarding habitat in the resource management units near Dubois. There was much interest in recreation-related proposals and in cultural/historical preservation, the latter especially so in the South Pass Management Unit. There was significant interest in possible landownership adjustments, timber and firewood sales, and access issues. These concerns were from a other federal agencies, state and local government agencies, interest groups (primarily conservation groups), business and industry (primarily mineral industries), and many individuals with varying interests such as grazing leases, mining claims, recreational pursuits, guiding and outfitting, firewood cutting, nearby private landownership, historical preservation, etc.

The Rawlins District Advisory Council and the Grazing Board have been kept apprised of the progress of the RMP and their comments have been solicited throughout this process.

Each operator of an I, M, or C category grazing allotment has been contacted, either in person or in writing to discuss the categorization of that allotment.

Formal and informal meetings have been held with many members of the ranching and minerals communities and with other interest groups and agencies.

## CONSISTENCY

Coordination with other agencies and consistency with other plans was accomplished through continuous communications and cooperative efforts between BLM and involved federal, state, and local agencies and organizations. The Wyoming Governor's Clearinghouse will be supplied with numerous copies of this draft document for review to ensure consistency with the state's ongoing plans. County land use plans have been reviewed by the RMP team to ensure consistency.

Authorities for the Bureau of Indian Affairs from the Wind River Reservation have been coordinated with, as has the Bureau of Reclamation for the adjoining Boysen Reservoir project, and the U.S. Forest Service for the adjoining Shoshone National Forest.

## Consultation and Coordination

Local groups have been consulted to ensure that all parties are aware of the plans and objectives. A copy of the newsletter was distributed to all persons on the Lander RMP mailing list. This list is available at the Lander Resource Area office.

Copies of the document are available for review in the BLM offices at Lander, Rawlins, Worland, Casper, and Rock Springs, and in the county libraries in Fremont, Natrona, Sweetwater, and Carbon counties.

## AGENCIES AND ORGANIZATIONS CONSULTED

The planning team consulted with; mailed notices or drafts to; and/or received comments from the following organizations during development of the plan:

### Federal Agencies:

U.S. Department of the Interior  
Bureau of Reclamation  
Bureau of Indian Affairs  
Bureau of Land Management (other offices)  
National Parks Service  
Office of Surface Mining  
Fish and Wildlife Service  
U.S. Department of Agriculture  
Forest Service  
Soil Conservation Service  
Environmental Protection Agency  
Tennessee Valley Authority  
U.S. Department of Energy  
U.S. Department of Defense  
U.S. Department of Housing and Urban Development  
U.S. Department of Commerce  
U.S. Department of Transportation

### State Agencies:

Wyoming Office of the Governor  
State Planning Coordinators Office  
Game and Fish Department  
Recreation Commission  
Highway Department  
Public Lands Commission  
Public Lands and Farm Loan District  
University of Wyoming (various departments)  
State Historic Preservation Officer  
Central Wyoming College  
Archives Museums and Historical Dept.  
Department of Environmental Quality  
Geological Survey

### State Legislators:

Senators and Representatives of Fremont, Carbon, Sweetwater, Hot Springs, Sweetwater, Laramie and Albany Counties

### Counties and Cities:

Board of Fremont County Commissioners  
Natrona County Commissioners  
Carbon County Commissioners  
Sweetwater County Commissioners  
Hot Springs County Commissioners  
City of Lander  
City of Riverton  
Town of Dubois  
Town of Shoshone  
Town of Jeffery City  
Town of Atlantic Rim  
Town of South Pass  
Fremont County Planning Commission  
Natrona County Weed District  
Fremont County Weed District  
Fremont County Extension Agent  
Fremont County Solid Waste Disposal District

### Congressional Offices:

Office of Congressman Cheney  
Office of Senator Simpson  
Office of Senator Wallop

## DISTRIBUTION

In addition, notices, requests for comments, and copies of this document have been sent to businesses, organizations, interest groups, and individuals. The mailing list is available at the Rawlins BLM District office or the Lander Resource Area office for review.

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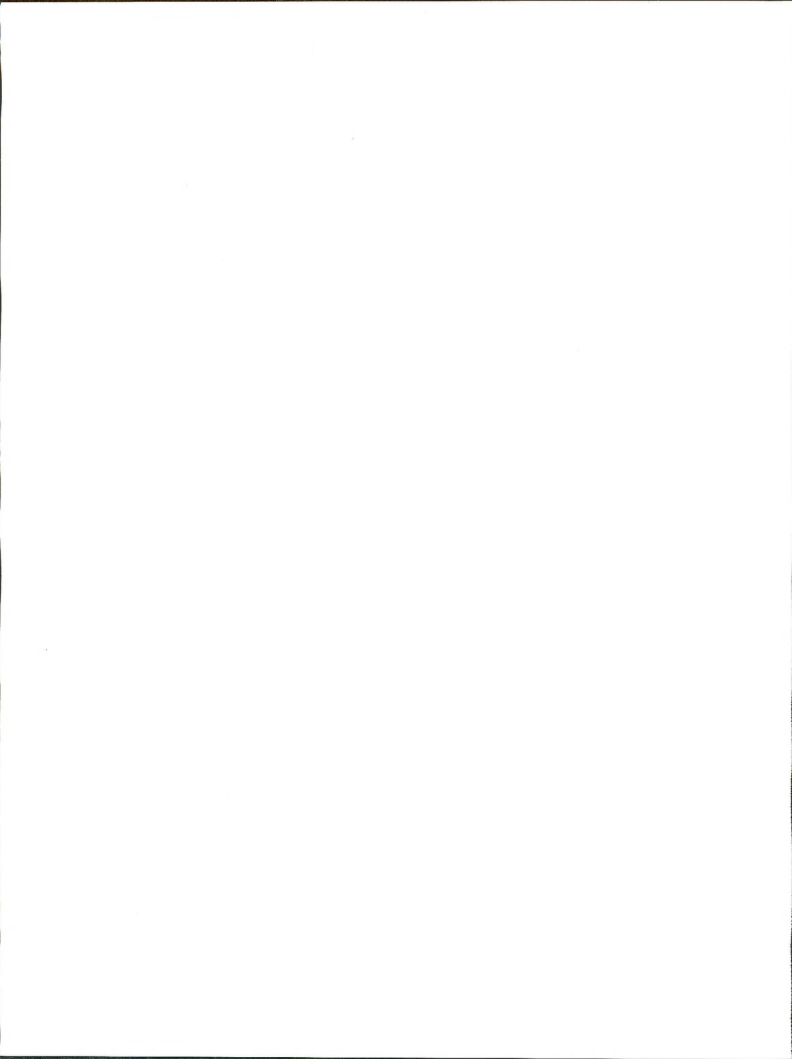
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## APPENDIX 1

### ALTERNATIVES BY MANAGEMENT UNIT

This appendix presents the alternatives by management unit that, when combined with Management Actions Common to All Alternatives (Chapter II), the proposed action for livestock grazing (see Grazing Supplement), and the proposed actions for Wilderness (see Wilderness Supplement), were analyzed in this RMP/EIS.



# Appendices

## GREEN MOUNTAIN NONWATER UNIT

Alternative A	Alternative B	Alternative C	Preferred Alternative
I. Energy & Minerals			
A. Oil and Gas			
The unit would be open for leasing, exploration and development. The following non-surface occupancy and seasonal restrictions would apply.	Same as Alternative A.	The entire unit would be open for leasing, exploration and development under the following guidelines.	Modified Alternative C. The entire unit would be open for leasing, exploration and development under the following guidelines.
<u>Non-surface Occupancy</u>		<u>Known Geologic Structures (KGSs) and areas with high potential for occurrence for oil and gas</u>	<u>Known Geologic Structures (KGSs) and areas with high potential for occurrence for oil and gas</u>
Non-surface occupancy would be used where needed to protect:	Same as Alternative A.		
1) water quality, fisheries, and riparian areas;		a. No seasonal restrictions except for those restrictions designed to protect threatened and endangered species.	All restrictions (seasonal, non-surface occupancy, etc.) would be considered as a case-by-case basis.
2) sage grouse breeding areas (leks);		b. The use of non-surface occupancy restrictions would be limited to those instances where it is necessary to protect nationally significant cultural and natural history resources or threatened and endangered plant and animal species.	Any restrictions imposed on exploration and production activities would be based on the need to avoid a significant adverse impact on another resource.
3) soils on steep slopes;			All restrictions are subject to review by the authorized officer with the exception of those needed to protect threatened and endangered plant and animal species or nationally significant cultural and natural history resources, under the following conditions:
4) threatened and endangered species;		c. Protection activities would be subject to specific placement and design of pads, roads, and facilities to minimize adverse impacts. Priority would be given to maintaining the economic recovery of the oil and gas resource.	1) Upon demonstration by the lessee or operator, via an acceptable development plan, that adverse impacts to other resources due to their development operations could be acceptably mitigated.
5) the sagebrush and picnic sites in Green Mountain;		d. Development plans would be required for operations within sensitive areas. These plans would have the potential to reduce aggregate road and pipeline construction costs as well as minimize adverse impacts on surface values.	2) At the initiative of the authorized officer when it has been determined that certain restrictions are no longer necessary.
6) the alk crucial winter range on the north slope of Green Mountain.			Areas with low, moderate, and no potential for occurrence of oil and gas.
<u>Seasonal Restrictions For Exploration Activities</u>	Same as Alternative A.		<u>No-surface Occupancy</u>
Seasonal restrictions would be used where needed to protect crucial elk deer winter range, crucial antelope winter range, sage grouse nesting areas, raptor nesting sites, and alk winter range.			No-surface occupancy would be used where needed to protect
1) male deer and antelope critical winter range December-April			
2) elk winter range December-April			
3) elk calving areas May-June			
4) sage grouse nesting areas March-June			
5) raptor nesting areas March-July			





## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
		<u>Seasonal Restrictions For Exploitation Activities</u> Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are crucial during most years are: 1) big game crucial winter range December-April 2) elk winter range December-April 3) elk calving areas May-June 4) sage grouse nesting areas March-June 5) raptor nesting areas March-July	
<u>Harvest Restrictions</u> All snettiber would be harvested through irregular clearcuts under 25 acres each. No clearcutting within 300 feet of perennial streams would be allowed, but partial cutting would be allowed within the 300-foot buffer zone. No harvest with conventional equipment (trucks and rubber tires) would be allowed on slopes greater than 45%. Harvesting on the mountain would attempt to maintain a ratio of approximately 40% cover to 60% openings in the overmature forestary areas for optimum elk habitat. When regeneration in areas harvested in the first rotation is large enough to provide big game cover, adjacent stands could be harvested.	<u>Harvest Restrictions</u> Same as Alternative A. Same as Alternative A. Same as Alternative A.	<u>Harvest Restrictions</u> Same as Alternative A. Same as Alternative A. Same as Alternative A. Girdling within aspen stands would be limited to removing mainly the overmature, decadent overstory trees of 7 inches in diameter, or larger. If any clearcuts were employed in aspen stands, they would be limited to 5 acres or less. If burning were employed in aspen stands, burns would be limited to approximately 10 acres.	<u>Harvest Restrictions</u> Alternative A. Alternative A. Alternative C. Alternative C.

## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
<p>B. <u>Utensils and Other Locatable Minerals</u></p> <p>The Green Mountain Management Unit would be open for exploration and development of utensils and other locatable minerals, except for the BLM congress and BLM and county picnic sites (120 acres).</p>	<p>Same as Alternative A.</p> <p>In addition, a plan of operations would be required for exploration and development activity within 300 feet of the Spatswuk cabin.</p>	<p>Same as Alternative A.</p>	<p>Modified Alternative B. The Green Mountain Management Unit would be open for exploration and development of utensils and other locatable minerals, except for the BLM congress and BLM county picnic sites (120 acres).</p> <p>In addition, a plan of operations would be required for exploration and development activity within 300 feet of the Spatswuk cabin or within the area designated as crucial elk winter range on the north slope of Green Mountain.</p>
<p>II. <u>Fish and Wildlife</u></p> <p>Existing wildlife/fisheries habitat improvements would be maintained. Routine improvement projects (to enhance and maintain wildlife/fisheries resources) would be completed after interagency review.</p>	<p>Same as Alternative A.</p>	<p>Same as Alternative A, except for the following addition.</p> <p>Prescribed burn and/or riparian management practices would be used to improve habitat for elk and mule deer (see Forestry and Fire Management).</p>	<p>Alternative C.</p>
<p>III. <u>Forest Management</u></p> <p><u>Harvest Levels</u></p> <p>750-1000 MGF of sawtimber would be harvested each year, together with another 1500-1700 MGF of firewood and post and poles.</p>	<p><u>Harvest Levels</u></p> <p>An accelerated harvest would be undertaken to salvage beetle-killed timber, reduce the fire hazard created by the recent beetle attacks and to regenerate harvested areas to utilize the production potential of the land.</p> <p>Harvest would generally be based on the market demand for the next 10-15 years, or until the majority of the dead timber has been removed. An attempt to develop new markets would be made to increase the sawtimber harvest level to 7-7.5 million board feet per year.</p> <p>In addition to the public demand for fuelwood and other products of 1.2-2 MGF per year.</p>	<p><u>Harvest Levels</u></p> <p>Offer approximately 1-3 MGF per year in sawtimber together with 1.5-2.0 MGF to meet the public demand for firewood, posts and poles. This would be harvested on a compartment basis, until the majority of the beetle-killed timber has been salvaged.</p>	<p>Alternative C.</p>

## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
<u>Regeneration</u>	<u>Regeneration</u>	<u>Regeneration</u>	<u>Regeneration</u>
Sites would be prepared through slash piling and burning.	Same as Alternative A.	Same as Alternative A.	Alternative A.
Regeneration would occur mostly through natural processes, but some artificial regeneration would also be employed.	Same as Alternative A.	Same as Alternative A.	Alternative A.
Precommercial or commercial thinning would be used as required.	Same as Alternative A.	Same as Alternative A.	Alternative A.
TV. Landownership Adjustments and Utility Systems			
No lands would be sold or exchanged under this alternative.	Same as Alternative A.	Two isolated tracts of public lands totalling 166 acres would be considered for disposal through land exchanges or public sales.	Alternative C.
Recreation and public purpose potentials would be leased on a case-by-case basis.	Same as Alternative A.	Recreation and public purpose potentials would be leased on a case-by-case basis.	Alternative A.
Public lands would be open for utility systems on a leased basis. These systems would be concentrated in existing utility corridors wherever possible.	Same as Alternative A.	Same as Alternative A.	Alternative A.
V. Recreation			
The BLM-administered campground and picnic area on Green Mountain would be maintained.	Same as Alternative A.	Same as Alternative A, with the following additions: Hazardous to public safety (roads, pits, etc.) would be eliminated and reclaimed. Aesthetic values would be enhanced through rehabilitation of disturbed areas, eliminating road construction and maintaining a healthy, diverse forest. Limit the number of commercial hunting camps.	Alternative C.

## Appendices

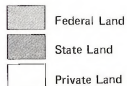
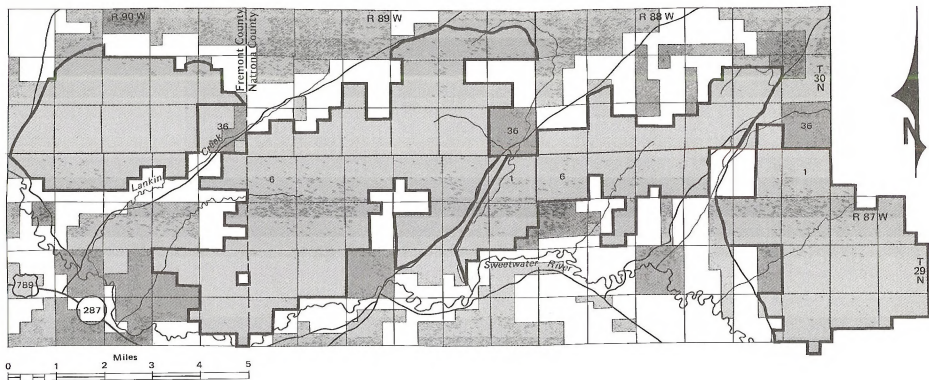
<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
<p>VI. Off-Road Vehicles</p> <p>Motorist traffic would be restricted to designated roads and vehicle routes.</p> <p>Roads would be closed from December through June (except for assemblies).</p>	<p>Same as Alternative A.</p> <p>Same as Alternative A.</p>	<p>Same as Alternative A.</p> <p>Same as Alternative A.</p>	<p>Alternative A.</p> <p>Alternative A.</p>
<p>VII. Cultural/Natural History</p> <p>No special management actions would be taken.</p>	<p>Same as Alternative A.</p>	<p>Same as Alternative A.</p>	<p>Alternative A.</p>
<p>VIII. Fire Management</p> <p>Full Suppression</p> <ol style="list-style-type: none"> <li>1. No specific equipment or firefighting restrictions.</li> <li>2. Prescribed burns allowed.</li> </ol>	<p>Full Suppression</p> <ol style="list-style-type: none"> <li>1. No bulldozers on initial attack; use of bulldozers after the initial attack would be determined through the escape fire analysis.</li> <li>2. Prescribed burns allowed.</li> </ol>	<p>Limited Suppression</p> <ol style="list-style-type: none"> <li>1. Specific actions would be included in a limited suppression plan.</li> <li>2. Suppression would occur when the fire:               <ol style="list-style-type: none"> <li>a. exceeds or has the potential to exceed the size specified in the plan;</li> <li>b. threatens private property;</li> <li>c. threatens other nonroad structures;</li> <li>d. threatens human life.</li> </ol> </li> <li>3. Prescribed burns allowed.</li> </ol>	<p>Alternative B.</p>
<p>IX. Access</p> <p>The existing transportation system in the unit would be maintained.</p>	<p>Same as Alternative A.</p> <p>Negotiations with landowners would be initiated to obtain easements for public access on the following roads:</p> <ol style="list-style-type: none"> <li>a. Willow Creek Road via Cooper Creek Road.</li> <li>b. Crooks Mountain Road.</li> <li>c. Taggart Meadows Road.</li> </ol> <p>The Cooper Creek fire access road would be obliterated and rehabilitated.</p>	<p>Same as Alternative A.</p>	<p>Alternative A.</p> <p>Alternative B.</p>





Map A-4  
Surface Ownership  
Sweetwater Canyon





Map A-3  
Surface Ownership  
Sweetwater Rocks







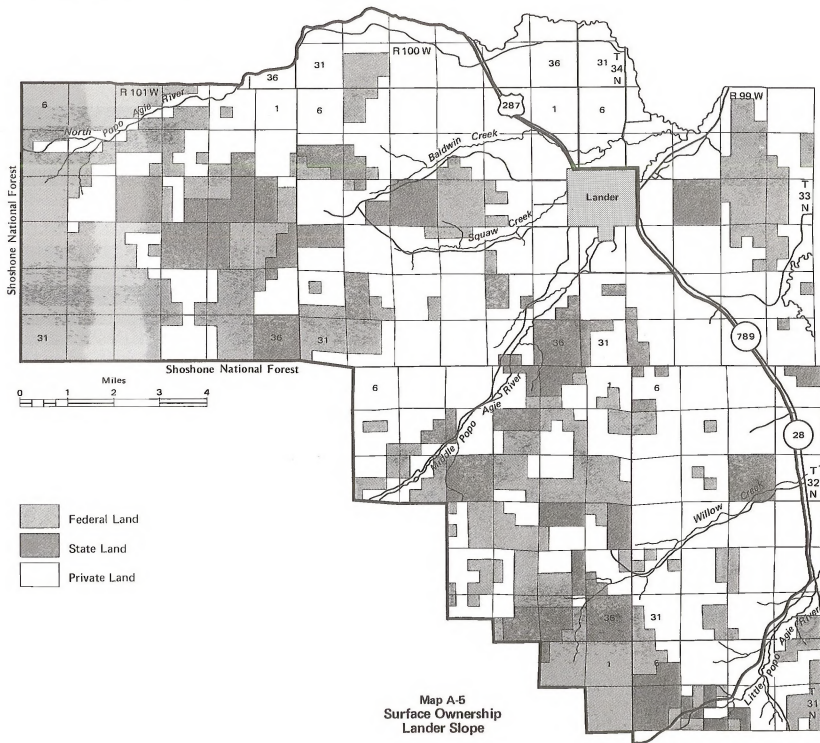
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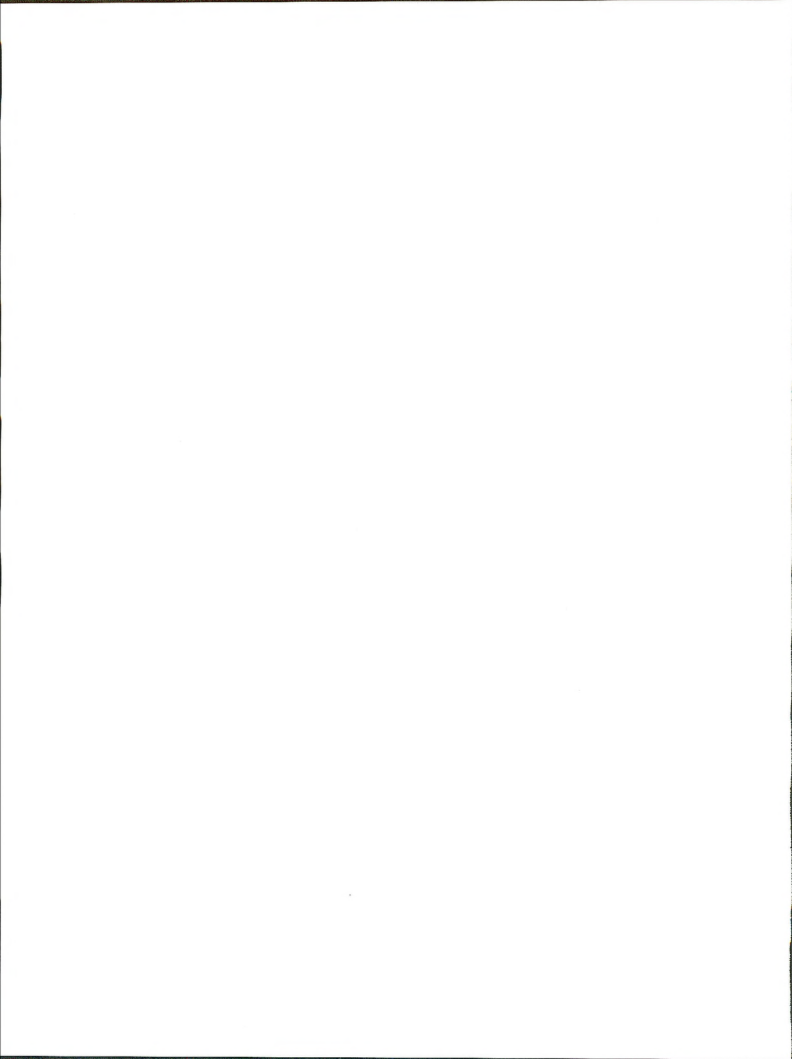
<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
	In addition, exploration and development within 1/4 mile of the visible horizon of the Oregon/Wenem Trail would require a plan of operation.		<p>- Areas within the 1/4 mile proposed National Register Site;</p> <p>- Streams with high fisheries values.</p> <p>- Within 1/4 mile or the visible horizon of the Oregon/Wenem Trail.</p>
<b>II. Fish and Wildlife</b>			
Existing wildlife/fisheries habitat improvements would be maintained. Routine improvement projects (to enhance and maintain wildlife/fisheries resources) would be completed after interdisciplinary review.	Same as Alternative A.	Same as Alternative A.	Alternative A.
Special management actions to improve fisheries, such as instream structure installation and fencing of streams and reservoirs would be undertaken in the upper portions of the Bearpaw River and Beaver Creek drainages.	Same as Alternative A.	Same as Alternative A.	Alternative A.
Special management actions, such as prescribed burns and other vegetative manipulation projects to improve mule deer and moose habitat, would also be undertaken.			
<b>III. Forest Management</b>			
Harvestable timber stands are limited in this unit. Therefore, sales would be considered on a case-by-case basis.	Same as Alternative A.	Same as Alternative A.	Alternative A.
<b>IV. Landownership Adjustments and Utility Systems</b>			
No lands would be sold or exchanged.	Same as Alternative A.	Some isolated tracts of public land would be disposed of through land exchange or public sales. These are 41 tracts encompassing 6,400 acres.	Modified Alternative C. To retain 17 tracts (3,300 acres) in public ownership and consider disposal of 28 tracts (3,100 acres) through sale or exchange.
Recreation and public purpose easements would be issued on a case-by-case basis.	Same as Alternative A.	The remainder of the unit would be retained in public ownership.	Alternative A.
Public lands would be open for utility systems on a demand basis. These systems would be concentrated in existing utility corridors whenever possible.	Same as Alternative A.	Same as Alternative A.	Modified Alternative A. The Oregon Trail corridor, Bearpaw Canyon, and Bearpaw Reservoir would generally be avoided for major above-ground utilities.
<b>V. Recreation</b>			
The interpretive site at Split Rock would be maintained.	Same as Alternative A.	Same as Alternative A.	Alternative A.
<b>VI. Off-Road Vehicles</b>			
Motorized traffic would be limited to existing roads and vehicle routes.	Same as Alternative A.	Same as Alternative A.	Alternative A.
<b>VII. Cultural/Natural History</b>			
No special management actions would be taken.	Negotiate with the landowner on acquisition of property at Burns Ranch Historic Site.	Same as Alternative A.	Alternatives B.
	Formal NCL designation and enrollment of Beaver Run proposed NCL in conjunction with the National Park Service.	Same as Alternative A.	

## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
<b>VIII. Fire Management</b>			
<b>Full Suppression</b>	<b>Full Suppression</b>	<b>Limited Suppression</b>	<b>Alternatives B and C. The unit has been divided into 3 suppression zones. The preferred alternative for each zone is:</b>
<ol style="list-style-type: none"> <li>1. No specific equipment or fire-fighting restrictions.</li> <li>2. Prescribed burns allowed.</li> </ol>	<ol style="list-style-type: none"> <li>1. No bulldozers on initial attack; use of bulldozers after the initial attack would be determined through the escape fire analysis.</li> <li>2. Prescribed burns allowed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Specific actions would be included in a limited suppression plan.</li> <li>2. Suppression would occur when the fire:               <ol style="list-style-type: none"> <li>a. exceeds or has the potential to exceed the status specified in the plan;</li> <li>b. threatens private property;</li> <li>c. threatens other man-made structures;</li> <li>d. threatens human life.</li> </ol> </li> <li>3. Prescribed burns allowed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Zone 1 - Alternative B</li> <li>2. Zone 2 - Alternative C</li> <li>3. Zone 3 - Alternative B</li> </ol>
<b>IX. Access</b>			
The existing transportation system in the unit would be maintained.	Same as Alternative A.	Same as Alternative A.	Alternative A.
	Negotiations with landowners would be initiated to obtain easements for public access on the following roads: <ol style="list-style-type: none"> <li>1. East Beaver Creek Road</li> <li>2. Twin Creek Road</li> <li>3. Government Line Road</li> <li>4. Signor Ridge Road</li> <li>5. Halsey-Alumic City Road</li> <li>6. Beaver Hill Road</li> <li>7. Wolf Gap Road</li> <li>8. Red Gap Road</li> </ol>		Alternative B.
<b>X. Wilderness</b>			
The Sweetwater Canyon MSA would be recommended as non-suitable for wilderness designation. Present multiple-use management would continue.	The Sweetwater Canyon MSA would be recommended as suitable for wilderness designation and managed under the BLM's Wilderness Management Policy.	(Implementation of the existing management proposal.) Manage the unit as an Area of Critical Environmental Concern (ACEC).	Modified Alternative B - Partial Wilderness (Confined Resolution Alternative).
The Sweetwater Rocks MSA (120, 122, 123a, 123b) would be recommended as non-suitable for wilderness designation. Present multiple-use management would continue.	The Sweetwater Rocks MSA (120, 122, 123a and 123b) would be recommended as suitable for wilderness designation and managed under the BLM's Wilderness Management Policy.	Same as Alternative A.	Alternative A.







# Appendices

## LARGER SLURRY MANAGEMENT UNIT

### Alternative A

#### I. Energy & Minerals

##### A. Oil and Gas

The entire unit would be closed to all oil and gas leasing, exploration and development.

### Alternative B

The unit would be open to leasing, exploration and development. The following non-surface occupancy and seasonal restrictions would apply.

#### Non-Surface Occupancy

No-surface occupancy would be used where needed to protect:

- 1) water quality, fisheries, and riparian areas;
- 2) sage grouse breeding areas (leas);
- 3) snails on steep slopes; threatened and endangered species;
- 4) significant cultural resource sites where data recovery methods cannot mitigate adverse impacts.

#### Seasonal Restrictions For Exploration Activities

Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are critical during most years are:

- 1) big game crucial winter range  
December-April
- 2) elk winter range  
December-April
- 3) elk calving areas  
May-June
- 4) sage grouse nesting areas  
March-June
- 5) riparian nesting sites  
March-July

### Alternative C

The entire unit would be open for leasing, exploration and development under the following guidelines.

#### Known Geologic Structures (NMS) and areas with high potential for occurrence for oil and gas

- a. No seasonal restrictions, except for those restrictions designed to protect threatened and endangered species.

- b. The use of non-surface occupancy restrictions would be limited to those instances where it is necessary to protect nationally significant cultural and natural history resources or threatened and endangered plant and animal species.

- c. Production activities would be subject to specific placement and design of pads, roads and facilities to minimize acreage disturbed. Priority would be given to understanding the economic recovery of the oil and gas resources.

- d. Development plans would be required for operations within sensitive areas. These plans would have the potential to reduce aggregate road and pipeline construction costs, as well as minimize adverse impacts on surface values.

### Preferred Alternative

Modified Alternative C. The entire unit would be open for leasing, exploration and development under the following guidelines.

#### Known Geologic Structures (NMS) and areas with high potential for occurrence for oil and gas

All restrictions (seasonal, non-surface occupancy, etc.) would be considered on a case-by-case basis.

Any restrictions imposed on exploration and production activities would be based on the need to avoid a significant adverse impact on critical resources.

All restrictions are subject to waiver by the authorized officer, with the exception of those needed to protect threatened and endangered plant and animal species or nationally significant cultural and natural history resources, under the following conditions:

- 1) Upon demonstration by the lessee or operator, via an acceptable development plan, that adverse impacts to other resources due to their development operations could be acceptably mitigated.
- 2) At the initiative of the authorized officer when it has been determined that certain restrictions are no longer necessary.

Areas with low, moderate, and no potential for occurrence of oil and gas.

#### Non-Surface Occupancy

Non-surface occupancy would be used where needed to protect:



## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
		<u>Seasonal Restrictions For Exploration Activities</u>	
		Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are crucial during most years are:	
		1) big game crucial winter ranges December-April	
		2) elk winter range December-April	
		3) elk calving areas November	
		4) sage grouse nesting areas March-June	
		5) raptor nesting sites March-July	
<b>B. Locatable Minerals</b>		Same as Alternative A.	Modified Alternative A. The management unit would be open for exploration and development of locatable minerals.
The management unit would be open for exploration and development of locatable minerals.	The unit would be closed for exploration and development of locatable minerals (requiring a withdrawal from mineral entry).		Plans of operations would be required for exploration and development activities (except casual use) within that portion of the management unit designated as the Lander Slope.
<b>C. Phosphates</b>			
No new prospecting or leasing would be allowed on the Lander Slope.	Same as Alternative A.	The entire unit would be available for prospecting, leasing, and development of phosphates.	Modified Alternative C. The entire unit would be available for prospecting, exploration and development, and leasing of phosphates with the standard protection requirements for surface disturbing activities described in Appendix 2.
<b>D. Other Actions</b>			
The lands around Sinks Canyon State Park would be withdrawn from mineral entry.	Same as Alternative A.	No withdrawal would be pursued.	Alternative A.
<b>II. Fish and Wildlife</b>			
Existing wildlife/fisheries habitat improvements would be maintained. Improvement projects (to enhance and improve wildlife/fisheries resources) would be completed after interdisciplinary review.	Same as Alternative A.	Same as Alternative A, except for the following addition:  Prescribed burns in stands of deciduous sagebrush and mountain shrubs would be used to improve forage for wintering elk, mule deer, moose, and bighorn sheep (see Forestry and Fire Management).	Alternative C.

# Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
<p>III. Forest Management</p> <p>No management or harvest of timber resources.</p>	<p>Timber management would be as follows:</p> <p>Large timber sales would be offered (up to 20 MBF). This large sale would allow construction of roads into the area for major access. This could possibly be in cooperation with the state, U.S. Forest Service, or private landowners in the area.</p> <p><u>Harvest Restrictions</u></p> <p>All snatches would be harvested utilizing irregular clearcuts under 25 acres each. No clearcutting within 100 feet of perennial streams would be allowed, but partial cutting would be allowed within the buffer zone.</p> <p>No harvesting with conventional equipment would be allowed on slopes greater than 45%.</p> <p>Harvesting would attempt to maintain a ratio of approximately 40% cover to 60% openings in the canopy (timber area) for optimum elk habitat. When regeneration in areas harvested in the first rotation is large enough to provide big game cover, adjacent stands could be harvested.</p> <p><u>Regeneration</u></p> <p>Sites would be prepared utilizing chain piling and burning techniques.</p> <p>Regeneration would occur solely through natural processes, but some artificial regeneration would be employed if natural regeneration failed.</p>	<p>Timber management would be as follows:</p> <p>About 40 MBF of snatches would be offered for sale at a rate of 1 MBF each year for 40 years.</p> <p>Approximately 400-500 acres of aspen stands would be approved for big game habitat by cutting or prescribed burning.</p> <p><u>Harvest Restrictions</u></p> <p>The unit would be open to harvest by clearcutting small areas.</p> <p>Same as Alternative A.</p> <p>No clearcutting would be allowed within 200 feet of streams, but areas could be partially cut within the 500-foot buffer zone.</p> <p>Root cuttings would be limited in aspen stands by removing stumps the overmature decadent overmature trees of 7 inches in diameter or larger.</p> <p>If any clearcuts were employed in aspen stands, they would be limited to 5 acres or less. If burning were employed in aspen stands, burns would be limited to approximately 10 acres or less.</p> <p>Only partial cutting would be allowed within 200 feet of perennial streams.</p> <p><u>Regeneration</u></p> <p>No special site preparation techniques are needed to provide regeneration in aspen stands, and natural regeneration would occur elsewhere.</p>	<p>Modified Alternative B. To offer one or more sales for a total of 5-15 MBF to be harvested over a period of not more than 5 years. After this initial period, activity would cease for about 10 years and the roads opened for logging would be closed.</p> <p><u>Harvest Restrictions</u></p> <p>Alternative B.</p> <p>Alternative B.</p> <p>Alternative B.</p> <p>Alternative B.</p> <p>Alternative B.</p>



## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
	Procedural or commercial thinning would take place as required.		
<b>IV. Landownership Adjustments and Utility Systems</b>			
No lands would be sold or exchanged under this alternative.	Same as Alternative A.	Some isolated tracts of public land would be considered for disposal through land exchange or public sales. There are 26 tracts encompassing about 4,400 acres.	Modified Alternative C. To retain 12 tracts (3,000 acres) in public ownership and consider disposal of 16 tracts (1,400 acres through sale or exchange).
Recreation and public purpose patents would be issued on a case-by-case basis.	Same as Alternative A.	Same as Alternative A.	Alternative A.
No major utility systems would be allowed.	Same as Alternative A.	Public lands would be open for utility systems on a demand basis.	Modified Alternative A. The mountain slopes would not be available for major utility systems. The lands near Highway 28 and 700 could be considered for major utility systems.
<b>V. Recreation</b>			
No special management actions would be taken.	The number of commercial hunting camps would be limited.	Same as Alternative A.	Alternative B.
<b>VI. Off-Road Vehicles</b>			
Vehicular traffic would be restricted to designated roads and vehicle routes.	Same as Alternative A.	Traffic would be limited to existing roads and trails.	Alternative A.
The area would be seasonally closed to traffic from December 1 to June 15 (except for snowmobiles).	Same as Alternative A.	No seasonal restrictions would be applied.	Alternative A.
<b>VII. Cultural/Heritage History</b>			
No special management actions would be taken.	Same as Alternative A.	Same as Alternative A.	Alternative A.
<b>VIII. Fire Management</b>			
<b>Full Suppression</b>	<b>Full Suppression</b>	<b>Limited Suppression</b>	<b>Alternative B.</b>
1. No specific equipment or fire-fighting restrictions.	1. No bulldozers on initial attack; use of bulldozers after the initial attack would be determined through the escape fire analysis.	1. Specific actions would be included in a limited suppression plan.	
2. Prescribed burns allowed.	2. Prescribed burns allowed.	2. Suppression would occur when the fire: <ul style="list-style-type: none"> <li>a. exceeds or has the potential to exceed the size specified in the plan;</li> <li>b. threatens private property;</li> <li>c. threatens other natural structures;</li> <li>d. threatens human life.</li> </ul>	
		3. Prescribed burns allowed.	
<b>IX. Access</b>			
The existing transportation system in the unit would be maintained.	The existing transportation system would be maintained.  Negotiations with landowners would be initiated to obtain easements for public access on the Putnam Basin Road.	Same as Alternative A.	Alternative B.



# Appendices

## RED CANYON MANAGEMENT UNIT

Alternative A	Alternative B	Alternative C	Preferred Alternative
<p>1. Energy &amp; Minerals</p> <p>A. Oil and Gas</p> <p>The entire unit would be closed to leasing, exploration and development.</p>	<p>The unit would be open to leasing, exploration and development. The following no-surface occupancy and seasonal restrictions would apply.</p> <p><u>No-Surface Occupancy</u></p> <p>No-surface occupancy would be used where needed to protect:</p> <ol style="list-style-type: none"> <li>1) water quality, fisheries, and riparian areas;</li> <li>2) sage grouse breeding areas (SBA);</li> <li>3) soils on steep slopes;</li> <li>4) threatened and endangered species;</li> <li>5) significant cultural resource sites where data recovery methods cannot mitigate adverse impacts;</li> <li>6) Red Canyon National Natural Landmark.</li> </ol> <p><u>Seasonal Restrictions For Exploration Activities</u></p> <p>Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are critical during most years are:</p> <ol style="list-style-type: none"> <li>1) Mg game crucial winter range December-April</li> <li>2) alk winter range December-April</li> <li>3) alk calving areas May-June</li> <li>4) sage grouse nesting areas March-June</li> <li>5) raptor nesting sites March-July</li> </ol>	<p>The entire unit would be open for leasing, exploration and development under the following guidelines.</p> <p><u>Known Geologic Structures (KGS) and areas with high potential for occurrence for oil and gas.</u></p> <ol style="list-style-type: none"> <li>a. No seasonal restrictions, except for those restrictions designed to protect threatened and endangered species.</li> <li>b. The use of no-surface occupancy restrictions would be limited to those instances where it is necessary to protect nationally significant cultural and natural history resources or threatened and endangered plant and animal species.</li> <li>c. Production activities would be subject to specific placement and design of pads, roads and facilities to minimize acreage disturbed. Priority would be given to maintaining the economic recovery of the oil and gas resource.</li> <li>d. Development plans would be required for operations within sensitive areas. These plans would have the potential to reduce aggregate road and pipeline construction costs, as well as minimize adverse impacts on surface values.</li> </ol>	<p>Modified Alternative C. The entire unit would be open for leasing, exploration and development under the following guidelines.</p> <p><u>Known Geologic Structures (KGS) and areas with high potential for occurrence for oil and gas.</u></p> <p>All restrictions (seasonal, no-surface occupancy, etc.) would be considered on a case-by-case basis.</p> <p>Any restrictions imposed on exploration and production activities would be based on the need to avoid a significant adverse impact on another resource.</p> <p>All restrictions are subject to waiver by the authorized officer, with the exception of those needed to protect threatened and endangered plant and animal species or nationally significant cultural and natural history resources, under the following conditions:</p> <ol style="list-style-type: none"> <li>1) Upon demonstration by the lessee or operator, via an acceptable development plan, that adverse impacts to other resources due to their development operations could be acceptably mitigated.</li> <li>2) At the initiative of the authorized officer when it has been determined that certain restrictions are no longer necessary.</li> </ol> <p>Areas with low, moderate, and no potential for occurrence of oil and gas.</p> <p><u>No-Surface Occupancy</u></p> <p>No-surface occupancy would be used where needed to protect:</p>

# Appendices

## Alternative A

## Alternative B

## Alternative C

## Preferred Alternative

e. Extensive surface and subsurface archeological investigations would be undertaken in the areas where there is high potential for both oil and gas development and the occurrence of cultural resources. In this way, significant cultural resources in high-development areas would benefit from study and excavation in a rational, well-planned, cost-effective manner, rather than in a piecemeal, unorganized, case-by-case manner.

### Areas with moderate potential for occurrence of oil and gas.

All restrictions (seasonal, no-surface occupancy, etc), would be considered on a case-by-case basis.

Any restrictions imposed on exploration and production activities would be based on the need to avoid a significant adverse impact on another resource.

### Area with low potential for occurrence of oil and gas

#### No-Surface Occupancy

No Surface Occupancy restrictions would be used where needed to protect:

- 1) water quality, fisheries, and riparian areas;
- 2) sage grouse breeding areas (lake);
- 3) rills in steep slopes;
- 4) threatened and endangered species;
- 5) significant cultural resource sites where data recovery methods cannot mitigate adverse impacts;
- 6) Red Canyon National Natural Landmark.

- 1) water quality, fisheries, and riparian areas;
- 2) sage grouse breeding areas (lake);
- 3) rills in steep slopes;
- 4) threatened and endangered species;
- 5) significant cultural resource sites where data recovery methods cannot mitigate adverse impacts;
- 6) Red Canyon National Natural Landmark.

#### Seasonal Restrictions For Exploration Activities

Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are crucial during next years are:

- 1) big game crucial winter ranges
- 2) December-April
- 3) elk winter range
- 4) December-April
- 5) elk calving areas
- 6) May-June
- 7) sage grouse nesting areas
- 8) March-June
- 9) raptor nesting areas
- 10) March-July

## Appendices

Alternative A	Alternative B	Alternative C	Preferred Alternative
		<p><u>Seasonal Restrictions For Exploration Activities</u></p> <p>Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are crucial during most years are:</p> <ol style="list-style-type: none"> <li>1) big game crucial winter ranges December-April</li> <li>2) elk winter range December-April</li> <li>3) elk calving areas May-June</li> <li>4) sage grouse nesting areas March-June</li> <li>5) raptor nesting sites March-July</li> </ol>	
<p>B. Uranium and Other Locatable Minerals</p> <p>The unit would be open for exploration and development of locatable minerals.</p>	<p>The unit would be closed for exploration and development of locatable minerals (requiring a withdrawal from mineral entry).</p>	<p>Same as Alternative A.</p>	<p>Modified Alternative A. The management unit would be open for exploration and development of locatable minerals.</p> <p>Plans of operations would be required for all exploration and development operations within the Red Canyon National Natural Landmark and within the area designated as the Lander Slope.</p>
<p>C. Phosphates</p> <p>No new prospecting permits or leasing would be issued.</p>	<p>Same as Alternative A.</p>	<p>The unit would be available for prospecting, leasing, and development of phosphates.</p>	<p>Modified Alternative C. The unit would be available for prospecting, exploration and development, and leasing of phosphates with the standard protection requirements for surface disturbing activities described in Appendix 2.</p>
<p>II. Fish and Wildlife</p> <p>Existing wildlife/fisheries habitat improvements would be maintained. Routine improvement projects (to enhance and improve wildlife/fisheries resources) would be completed after interagency review.</p> <p>A minimum of 500 acres of forage would be reserved for elk as stated in the BLM-WFO Cooperative Agreement.</p>	<p>Same as Alternative A.</p>	<p>Same as Alternative A.</p> <p>Same as Alternative A.</p> <p>Prescribed burns in stands of deciduous sagebrush and mountain shrub would be used to improve forage for wintering elk, mule deer, moose, and bighorn sheep. Cultural practices designed to promote open oak willow regeneration and improve conifer stands would also be used to improve wildlife habitat.</p>	<p>Alternative A.</p> <p>Alternative C.</p>

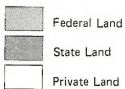
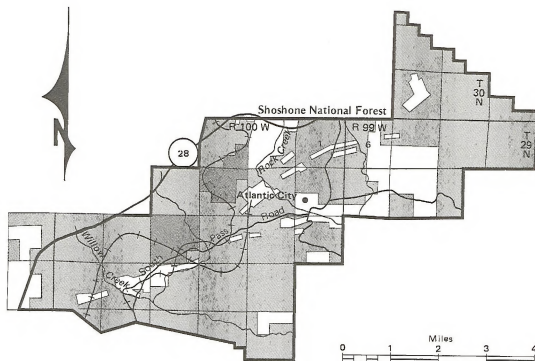
## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
Special management actions to improve fisheries, such as instream structure installation and fencing of streams would be undertaken on Burnett Creek.	Same as Alternative A.	Same as Alternative A.	Alternative A.
III. Forest Management			
Timber harvest would be allowed.	No timber harvests would be allowed.	Timber would be managed as follows:  Pamlico, posts and poles, houselogs, and other products would be sold as a demand basis until the majority of the products have been harvested and the areas regenerated.  Approximately 100-200 acres of aspen stands would be improved for big game habitat by cutting or prescribed burning.  <u>Harvest Restrictions</u>  Cuttings in conifer stands would be limited to partial cuts, removing products desired, and striving for complete regeneration of the stands.  Most of the cuts in aspen stands would be limited, removing mainly the decadent, overmature, overstory trees of 7 inches in diameter or larger.  If any clearcuts were employed in aspen stands, they would be limited to 5 acres or less. If any burning were employed in aspen stands, burns would be limited to approximately 10 acres or less.  Only partial cutting would be allowed within 100 feet of perennial streams.  <u>Regeneration</u>  Harvested sites in conifer stands would be prepared for regeneration by scarification of the soil during cutting. No special site preparation techniques would be necessary to provide regeneration in harvested or burned aspen stands.	Alternative C.  <u>Harvest Restrictions</u>  Alternative C.
IV. Landownership Adjustments and Utility Systems			
No lands would be sold or exchanged under this alternative.	Same as Alternative A.	Same as Alternative A.	Alternative A.



## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
Recreation and public purpose permits would be issued on a case-by-case basis.	Same as Alternative A.	Same as Alternative A.	Alternative A.
Public lands would be available for utility systems on a demand basis.	No major utility systems would be allowed.	Same as Alternative A.	Modified Alternative B. The unit would be avoided for major utility systems.
V. Recreation			
No special management actions would be taken.	Ad interpretation of Red Canyon National Natural Landmark.	Same as Alternative A.	Alternative B.
	Limit the number of commercial hunting camps.		Alternative B.
	The elk winter range area would be closed to all winter activities from December to June.	Allow no commercial hunting camps.	Alternative B.
VI. Off-Road Vehicles			
Vehicular traffic would be restricted to designated roads and vehicle routes.	Same as Alternative A.	Same as Alternative A.	Alternative A.
The area would be closed to traffic from December to June.	Same as Alternative A.	Same as Alternative A.	Alternative A.
VII. Cultural/Natural History			
Voluntary preservation of the Red Canyon National Natural Landmark would continue by BLM and by private landowners who have signed preservation agreements.	Same as Alternative A.	Same as Alternative A.	Alternative A.
VIII. Fire Management			
Full Suppression	Full Suppression	Limited Suppression	Alternative B.
1. No specific equipment or firefighting restrictions.	1. No bulldozers on initial attack; use of bulldozers after the initial attack would be determined through the escape fire analysis.	1. Specific actions would be included in a limited suppression plan.	
2. Prescribed burns allowed.	2. Prescribed burns allowed.	2. Suppression would occur when the fire: a. exceeds or has the potential to exceed the size specified in the plan; b. threatens private property; c. threatens other natural resources; d. threatens human life.	
		3. Prescribed burns allowed.	
IX. Access			
The existing transportation system in the unit would be maintained.	Same as Alternative A.	Same as Alternative A.	Alternative A.



Map A-7  
Surface Ownership  
South Pass

# Appendices

SOUTH PASS MANAGEMENT UNIT

Alternative A	Alternative B	Alternative C	Preferred Alternative
<p>1. <b>Recovery &amp; Minerals</b></p> <p>A. <b>Oil and Gas</b></p> <p>The entire unit would be open to leasing, exploration and development. The following non-surface occupancy and seasonal restrictions would apply.</p> <p><u>Non-Surface Occupancy</u></p> <p>Non-surface occupancy would be used where needed to protect:</p> <ol style="list-style-type: none"> <li>1) water quality, fisheries, and riparian areas;</li> <li>2) sage grouse breeding areas (leak);</li> <li>3) soils on steep slopes;</li> <li>4) threatened and endangered species;</li> <li>5) significant cultural resources since where data recovery includes cannot mitigate adverse impacts.</li> </ol> <p><u>Seasonal Restrictions For Exploration Activities</u></p> <p>Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are crucial during most years are:</p> <ol style="list-style-type: none"> <li>1) big game crucial winter ranges December-April</li> <li>2) elk winter range December-April</li> <li>3) elk calving areas May-June</li> <li>4) sage grouse nesting areas March-June</li> <li>5) raptor nesting sites March-July</li> </ol>	<p>The unit would be open to leasing, exploration and development. The following non-surface occupancy and seasonal restrictions would apply.</p> <p><u>Non-Surface Occupancy</u></p> <p>Non-surface occupancy would be used where needed to protect:</p> <ol style="list-style-type: none"> <li>1) water quality, fisheries, and riparian areas;</li> <li>2) sage grouse breeding areas (leak);</li> <li>3) soils on steep slopes;</li> <li>4) threatened and endangered species;</li> <li>5) crucial habitats for avian;</li> <li>6) the area proposed as a National Historic Mining District;</li> <li>7) Atlantic City and Big Atlantic Gulch campgrounds.</li> </ol> <p><u>Seasonal Restrictions For Exploration Activities</u></p> <p>Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are crucial during most years are:</p> <ol style="list-style-type: none"> <li>1) big game crucial winter ranges December-April</li> <li>2) elk winter range December-April</li> <li>3) elk calving areas May-June</li> <li>4) sage grouse nesting areas March-June</li> <li>5) raptor nesting sites March-July</li> </ol>	<p>The entire unit would be open to leasing, exploration and development under the following guidelines.</p> <p><u>Non-Surface Occupancy</u></p> <p>Non-surface occupancy would be used where needed to protect:</p> <ol style="list-style-type: none"> <li>a. No seasonal restrictions except for those restrictions designed to protect threatened and endangered species.</li> <li>b. The use of non-surface occupancy restrictions would be limited to those instances where it is necessary to protect nationally significant cultural and natural history resources or threatened and endangered plant and animal species.</li> <li>c. Production activities would be subject to specific placement and design of pads, roads and facilities to minimize adverse impacts. Priority would be given to maintaining the economic recovery of the oil and gas resources.</li> <li>d. Development plans would be required for operations within sensitive areas. These plans would have the potential to reduce aggregate road and pipeline construction costs as well as minimize adverse impacts on surface values.</li> </ol>	<p>modified Alternative C. The entire unit would be open to leasing, exploration and development under the following guidelines.</p> <p><u>Non-Surface Occupancy</u></p> <p>Non-surface occupancy would be used where needed to protect:</p> <ol style="list-style-type: none"> <li>1) Upon demonstration by the lessee or operator, via an acceptable development plan, that adverse impacts to other resources due to their development operations could be acceptably mitigated.</li> <li>2) At the initiative of the authorized officer when it has been determined that certain restrictions are no longer necessary.</li> </ol> <p>Areas with low, moderate, and no potential for occurrence of oil and gas.</p> <p><u>Non-Surface Occupancy</u></p> <p>Non-surface occupancy would be used where needed to protect:</p>

# Appendices

## Alternative A

## Alternative B

## Alternative C

## Preferred Alternative

- e. Extensive surface and subsurface archaeological investigation would be undertaken in the areas where there is potential for both oil and gas development and the occurrence of cultural resources. In this way, significant cultural resources in high development areas would benefit from study and protection in a systematic, well-planned, cost-effective manner, rather than in a piecemeal, unorganized, case-by-case manner.

### Areas with moderate potential for occurrence of oil and gas.

All restrictions (seasonal, no-surface occupancy, etc.) would be considered on a case-by-case basis.

Any restrictions imposed on exploration and production activities would be based on the need to avoid a significant adverse impact on another resource.

### Areas with low potential for occurrence of oil and gas.

#### No-Surface Occupancy

No Surface Occupancy restrictions would be used where needed to protect:

- 1) water quality, fisheries, and riparian areas;
- 2) sage grouse breeding areas (Idaho);
- 3) soils on steep slopes;
- 4) threatened and endangered species;
- 5) significant cultural resource sites where data recovery methods cannot mitigate adverse impacts.

- 1) water quality, fisheries, and riparian areas;
- 2) sage grouse breeding areas (Idaho);
- 3) soils on steep slopes;
- 4) threatened and endangered species;
- 5) significant cultural resource sites where data recovery methods cannot mitigate adverse impacts;
- 6) crucial habitats for moose;
- 7) the areas proposed as a National Historic Mining District;
- 8) Atomic City and Big Atomic Gulch campgrounds.

### Seasonal Restrictions For Exploration Activities

Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are crucial during most years are:

- 1) big game crucial winter ranges
- 2) elk winter range
- 3) December-April
- 4) elk calving areas
- 5) May-June
- 6) sage grouse nesting areas
- 7) March-June
- 8) raptor nesting areas
- 9) March-July

## Appendices

### Alternative A

### Alternative B

### Alternative C

### Preferred Alternative

e. Extensive surface and subsurface archaeological investigations would be undertaken in the areas where there is high potential for both oil and gas development and the occurrence of cultural resources. In this way, significant cultural resources in high-development areas would benefit from study and excavation in a rational, well-planned, cost-effective manner, rather than in a piecemeal, uncoordinated, case-by-case manner.

#### Areas with moderate potential for occurrence of oil and gas.

All restrictions (seasonal, resource occupancy, etc.) would be considered on a case-by-case basis.

Any restrictions imposed on exploration and production activities would be based on the need to avoid a significant adverse impact on another resource.

#### Areas with low potential for occurrence of oil and gas.

##### No Surface Occupancy

No Surface Occupancy restrictions would be used where needed to protect:

- 1) water quality, fisheries, and riparian areas;
- 2) sage grouse breeding areas (H&B);
- 3) soils on steep slopes;
- 4) threatened and endangered species;
- 5) significant cultural resource sites where data recovery methods cannot mitigate adverse impacts.

##### Seasonal Restrictions For Exploration Activities

Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are crucial during most years are:

- 1) big game crucial winter ranges  
December-April
- 2) elk winter range  
December-April
- 3) elk calving areas  
May-June
- 4) sage grouse nesting areas  
March-June
- 5) raptor nesting sites  
March-July

### D. Locatable Minerals

The entire unit would be open for exploration and development of locatable minerals. However, activity would be restricted to May 1 through November 15, to protect watershed and wildlife values.

The entire unit would be closed to exploration and development of locatable minerals. (This would require continued action).

Exploration and development of locatable minerals would be limited to activities on claims that represent valid, existing rights.

The entire unit would be open for exploration and development of locatable minerals.

### Modified Alternative C

A plan of operations would be required for all exploration and development operations within the area previously included in the Roberts National O&G.

## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
		<u>Seasonal Restrictions for Exploration Activities</u>	
		Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are crucial during most years are:	
		1) Big game crucial winter ranges December-April	
		2) elk winter range December-April	
		3) elk calving areas May-June	
		4) sage grouse nesting areas March-June	
		5) raptor nesting sites March-July	
<b>B. Gold and Other Locatable Minerals</b>			
The management unit would be open for exploration and development of gold and other locatable minerals (except for those already segregated from mineral entry).	The unit would be closed for exploration and development of gold and other locatable minerals (requiring a withdrawal).	The unit would be open for exploration and development of gold and other locatable minerals. Plans of operation would be required on all mining activities.	The management unit would be open for exploration and development of gold and other locatable minerals (except for those already segregated from mineral entry).  Plans of operations would be required for all exploration and development operations (except casual use) within the management unit.
<b>II. Fish and Wildlife</b>			
<b>Protecting wildlife/fisheries habitat</b> Improvements would be initiated. Improvement projects to enhance and maintain wildlife/fisheries resources would be completed after interagency and environmental review.	Same as Alternative A.	Same as Alternative A.  In addition to actions in Alternative A, prescribed burns and/or aspen regeneration practices would be used to improve moose habitat (see Section IV, Forestry and Section IX, Fire Management).	Alternative C.
<b>Special management actions for maintenance and improvement of fisheries</b> would occur on streams and beaver ponds. Actions would include aspen management, beaver management, instream structures, fencing, etc. South Pass would be the focus of fisheries management for the resource area.			

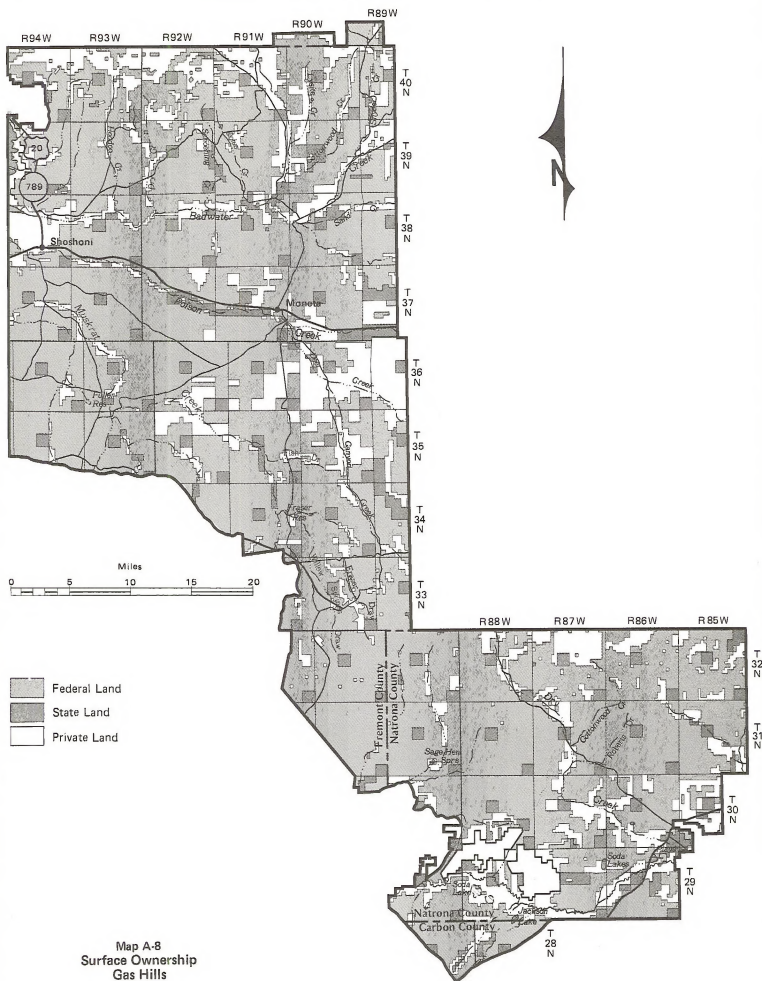


## Appendices

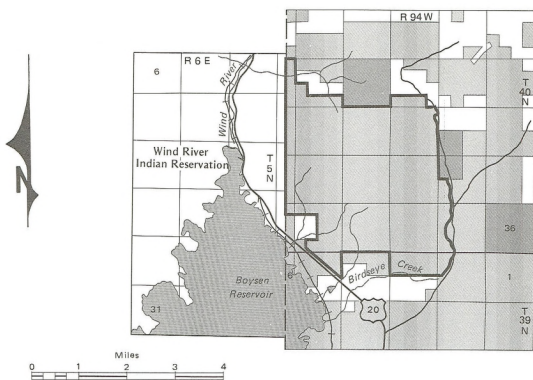
<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
	<p>Manage the area to maintain a rustic, open-space character and protect historical sites.</p> <p>Existing road system would not be upgraded.</p> <p>The number of commercial hunting camps would be limited.</p> <p>An interpretive display at Pukasky Ridge and information signage at Miner's Delight townsite would be developed.</p>		<p>Alternative B.</p> <p>Alternative B.</p> <p>Alternative B.</p> <p>Alternative B.</p>
<b>VI. Off-Road Vehicles</b>			
Vehicle traffic would be limited to existing roads and vehicle routes.	Same as Alternative A.	Same as Alternative A.	Alternative A.
<b>VII. Cultural/Natural History</b>			
A management plan for the South Pass Historic Mining area would be written and would include significant historical sites being preserved and fenced.	A management plan for the South Pass Historic Mining area would be written and would include all significant historical sites being preserved through stabilization, fencing, chemical treatment of woods, reclamation of sites, and erosion of sensitive resources, on an accelerated basis.	Same as Alternative B. In addition, conduct limited test excavation at Miner's Delight townsite.	Alternative C.
Sites would be patrolled to decrease vandalism.	Same as Alternative A.	Same as Alternative A.	Alternative A.
All land uses on public lands would conform with historical zoning in section 20 around South Pass City.	Same as Alternative A.	Same as Alternative A.	Alternative A.
<b>VIII. Fire Management</b>			
<b>Full Suppression</b>	<b>Full Suppression</b>	<b>Limited Suppression</b>	Alternative A.
<ol style="list-style-type: none"> <li>1. No specific equipment or fire-fighting restrictions.</li> <li>2. Prescribed burns allowed.</li> </ol>	<ol style="list-style-type: none"> <li>1. No haldosers on initial attack until the initial attack would be determined through the escape time analysis.</li> <li>2. Prescribed burns allowed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Specific actions would be included in a limited suppression plan.</li> <li>2. Suppression would occur when the fire:               <ol style="list-style-type: none"> <li>a. exceeds or has the potential to exceed the area specified in the plan;</li> <li>b. threatens private property;</li> <li>c. threatens other resource structures;</li> <li>d. threatens human life.</li> </ol> </li> <li>3. Prescribed burns allowed.</li> </ol>	
<b>IX. Access</b>			
The existing transportation system would be maintained.	Same as Alternative A.	Same as Alternative A.	Alternative A.

## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
<p>III. Forest Management</p> <p>Timber would be harvested on small, isolated tracts.</p>	<p>Timber management would be as follows:</p> <p>Timber lands would be intensively managed to remove mature, overmature, and dead timber and regenerate all areas to young, healthy growing stock. All scattered areas of larger timber would be offered for sale, until most areas have been harvested and regenerated.</p> <p><u>Harvest Restrictions</u></p> <p>Cleareuts would be 25 acres or less.</p> <p>No logging with conventional equipment would take place on slopes greater than 45%.</p> <p><u>Regeneration</u></p> <p>Would rely on natural regeneration. If this failed artificial methods would be employed.</p> <p>Harvested sites would be prepared for regeneration, utilizing slash piling and burning techniques or broadcast burning.</p> <p>Precommercial or commercial thinning would be done as necessary.</p>	<p>Timber would be managed as follows:</p> <p>Small volumes of overstory trees in conifer stands would be offered for sale until the majority of stands have been harvested and regenerated.</p> <p>Approximately 600-700 acres of aspen stands would be managed to improve aspen habitat. Management actions would include sales, forest-stand projects, contracts, or prescribed burning.</p> <p><u>Harvest Restrictions</u></p> <p>Hot cuts in conifer and aspen stands would be limited to partial cuts or removing dominant trees 7 inches and over to create regeneration.</p> <p>If any clearcuts were employed in the aspen stands, they would be limited to 5 acres or less. If burning were employed in aspen stands, burns would be limited to 10 acres or less.</p> <p><u>Regeneration</u></p> <p>Same as Alternative B.</p> <p>Harvest sites in coniferous stands would be prepared for regeneration by scarification of the soil during logging. Aspen areas used no special site preparation techniques to create regeneration.</p> <p>Same as Alternative B.</p>	<p>Alternative C.</p> <p><u>Harvest Restrictions</u></p> <p>Alternative C.</p> <p>Alternative C.</p> <p>Alternative B.</p> <p>Alternative C.</p> <p>Alternative B.</p>
<p>IV. Landownership Adjustments and Utility Systems</p> <p>% lands would be sold or exchanged under this alternative.</p> <p>Recreation and public purpose interests would be focused on a case-by-case basis.</p> <p>Public lands would be open for utility systems.</p> <p>V. Recreation</p> <p>Existing campgrounds would be maintained.</p>	<p>Same as Alternative A.</p> <p>Same as Alternative A.</p> <p>Public lands would be closed for utility systems.</p> <p>Campgrounds would be maintained; no new campgrounds would be built, and hazards would be fenced.</p>	<p>Same as Alternative A.</p> <p>Same as Alternative A.</p> <p>No major utility systems would be allowed.</p> <p>Same as Alternative A.</p>	<p>Alternative A.</p> <p>Alternative A.</p> <p>Modified Alternative B. The unit would be avoided for major utility systems.</p> <p>Alternative B.</p>



Map A-8  
Surface Ownership  
Gas Hills



Map A-9  
Surface Ownership  
Copper Mountain

# Appendices

## ONE HILLS MANAGEMENT UNIT

Alternative A	Alternative B	Alternative C	Preferred Alternative
<p>I. Energy &amp; Minerals</p> <p>A. Oil and Gas</p> <p>The unit would be open to leasing, exploration and development, except for 80 acres segregated from mineral entry at the Castle Gardens tract and picnic site area and 720 acres withdrawn at the Devil's Gate Landsmark and along the Oregon/Vernon Trail. The following non-surface occupancy and seasonal restrictions would apply.</p> <p><u>Non-Surface Occupancy</u></p> <p>Non-surface occupancy would be used where needed to protect:</p> <ol style="list-style-type: none"> <li>1) water quality, fisheries, and riparian areas;</li> <li>2) sage grouse breeding areas (leks);</li> <li>3) soils on steep slopes;</li> <li>4) threatened and endangered species;</li> <li>5) significant cultural resource sites where data recovery methods cannot mitigate adverse impacts;</li> <li>6) 1/4 mile on either side of the Oregon/Vernon Trail or the visible horizon, whichever is closer;</li> <li>7) interpretive sites at Devil's Gate;</li> <li>8) the area within the Martin's Cove National Register Site.</li> </ol> <p><u>Seasonal Restrictions For Exploration Activities</u></p> <p>Seasonal restrictions would be used where needed to protect crucial mule deer winter range, crucial antelope winter range, sage grouse nesting areas, raptor nesting sites, and elk winter range.</p> <ol style="list-style-type: none"> <li>1) mule deer and antelope critical winter range December-April</li> <li>2) elk winter range December-April</li> <li>3) elk calving areas May-June</li> <li>4) sage grouse nesting areas March-June</li> <li>5) raptor nesting sites March-July</li> </ol>	<p>Same as Alternative A.</p> <p><u>Non-Surface Occupancy</u></p> <p>Non-surface occupancy would be used where needed to protect:</p> <ol style="list-style-type: none"> <li>1) water quality, fisheries, and riparian areas;</li> <li>2) sage grouse breeding areas (leks);</li> <li>3) soils on steep slopes;</li> <li>4) threatened and endangered species;</li> <li>5) significant cultural resource sites where data recovery methods cannot mitigate adverse impacts;</li> <li>6) 1/4 mile on either side of the Oregon/Vernon Trail or the visible horizon, whichever is closer;</li> <li>7) interpretive sites at Devil's Gate;</li> <li>8) the area within the Martin's Cove National Register Site.</li> </ol> <p>Same as Alternative A.</p>	<p>The entire unit would be open for leasing, exploration and development under the following guidelines.</p> <p><u>Known Geologic Structures (KGSs) and areas with high potential for occurrence for oil and gas</u></p> <ol style="list-style-type: none"> <li>a. No seasonal restrictions except for those restrictions designed to protect threatened and endangered species.</li> <li>b. The use of non-surface occupancy restrictions would be limited to those instances where it is necessary to protect nationally significant cultural and natural history resources or threatened and endangered plant and animal species.</li> <li>c. Production activities would be subject to specific placement and design of pads, roads and facilities to minimize adverse disturbance. Priority would be given to conducting the economic recovery of the oil and gas resources.</li> <li>d. Development plans would be required for operations within sensitive areas. These plans would have the potential to reduce aggregate road and pipeline construction costs as well as minimize adverse impacts on surface values.</li> </ol>	<p>Modified Alternative C. The entire unit would be open for leasing, exploration and development under the following guidelines.</p> <p><u>Known Geologic Structures (KGSs) and areas with high potential for occurrence for oil and gas</u></p> <p>All restrictions (seasonal, non-surface occupancy, etc.) would be considered on a case-by-case basis.</p> <p>Any restrictions imposed on exploration and production activities would be based on the need to avoid a significant adverse impact on another resource.</p> <p>All restrictions are subject to waiver by the authorized officer, with the exception of those needed to protect threatened and endangered plant and animal species or nationally significant cultural and natural history resources, under the following conditions:</p> <ol style="list-style-type: none"> <li>1) Upon demonstration by the lessee or operator, via an acceptable development plan, that adverse impacts to other resources due to their development operations could be acceptably mitigated.</li> <li>2) At the initiative of the authorized officer when it has been determined that certain restrictions are no longer necessary.</li> </ol> <p>Areas with low, moderate, and no potential for occurrence of oil and gas.</p> <p><u>Non-Surface Occupancy</u></p> <p>Non-surface occupancy would be used where needed to protect:</p> <ol style="list-style-type: none"> <li>1) water quality, fisheries, and riparian areas;</li> <li>2) sage grouse breeding areas (leks);</li> <li>3) soils on steep slopes;</li> </ol>



## Appendices

Alternative A	Alternative B	Alternative C	Preferred Alternative
		<p><u>Seasonal Restrictions For Exploration Activities</u></p> <p>Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are crucial during most years are:</p> <ol style="list-style-type: none"> <li>1) big game crucial winter range December-April</li> <li>2) elk winter range December-April</li> <li>3) elk calving areas May-June</li> <li>4) sage grouse nesting areas March-June</li> <li>5) raptor nesting areas March-July</li> </ol>	
<p><u>B. Uranium and Other Locatable Minerals</u></p> <p>The unit would be open for exploration and development of uranium and other locatable minerals, except for 80 acres segregated around the Gangle Garden rock art picnic site and 720 acres withdrawn at the Devil's Gate landmark and along the Oregon/Neuman Trail.</p>	<p>Same as Alternative A.</p> <p>In addition, exploration and development within 1/4 mile or the visible horizon of the Oregon/Neuman Trail would require a plan of operation.</p> <p>Also, the Martin's Cove National Register Site would be closed to exploration and development (requiring a withdrawal).</p>	<p>Same as Alternative A.</p> <p>In addition, exploration and development within 1/4 mile of the visible horizon of designated segments of the Oregon/Neuman Trail would require a plan of operation.</p> <p>Also, the Martin's Cove National Register Site would be closed to exploration and development (requiring a withdrawal).</p>	<p>The unit would be open for exploration and development of uranium and other locatable minerals, except for 80 acres segregated around the Gangle Garden rock art picnic site and 720 acres withdrawn at the Devil's Gate landmark and along the Oregon/Neuman Trail.</p> <p>In addition, exploration and development within 1/4 mile of the visible horizon of designated segments of the Oregon/Neuman Trail would require a plan of operation.</p> <p>Also, the Martin's Cove National Register Site would be closed to exploration and development (requiring a withdrawal).</p>
<p><u>II. Fish and Wildlife</u></p> <p>Existing wildlife/fisheries habitat improvements would be maintained. Routine improvement projects (to enhance and maintain wildlife/fisheries resources) would be completed after interdisciplinary review.</p>	<p>Same as Alternative A, with the following addition.</p> <p>Bighorn sheep would be reintroduced into the Sweetwater Ranges.</p>	<p>Same as Alternative A.</p>	<p>Alternative B.</p>



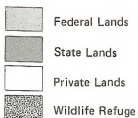
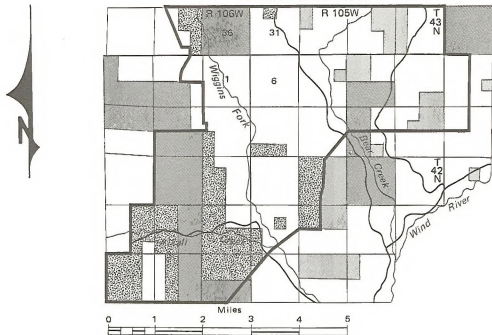
## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
<b>III. Forest Management</b>			
Harvested timber stands are limited in this unit. Therefore, sale would be considered on a case-by-case basis.	Same as Alternative A.	Same as Alternative A.	Alternative A.
<b>IV. Landownership Adjustments and Utility Systems</b>			
No lands would be sold or exchanged under this alternative.	Same as Alternative A.	Some isolated tracts of public land would be considered for disposal through land exchange or public sales. There are 61 tracts encompassing about 6,000 acres.	Modified Alternative C. To retain 20 tracts (2,300 acres) in public ownership and consider disposal of 41 tracts (3,700 acres) through sale or exchange.
Recreation and public purpose permits would be issued on a case-by-case basis.	Same as Alternative A.	Same as Alternative A.	Alternative A.
Public lands would be open for utility systems on a demand basis. These systems would be concentrated in existing utility corridors whenever possible.	Same as Alternative A.	Same as Alternative A.	Modified Alternative A. The Oregon/Vernon Trail corridor and Sweetwater Rocks would generally be avoided for major above-ground utility systems.
<b>V. Recreation</b>			
The interpretive site at Devil's Gate would be maintained.	Same as Alternative A.	Same as Alternative A.	Alternative A.
The picnic area at Castle Gardens would be maintained.	Same as Alternative A. Develop interpretive site on Castle Garden picnic site.	Same as Alternative A.	Alternative A.
<b>VI. Off-Road Vehicles</b>			
No ORV designations would be made.	All traffic would be limited to existing roads and vehicle routes.	Same as Alternative B with the addition that the Castle Gardens outcrops would be closed to ORV use.	Alternative C.
<b>VII. Cultural/Neocultural History</b>			
No special management actions would be taken.	Same as Alternative A with the following addition:  A management plan for the Castle Gardens rock art and picnic area would be written and would include installing walkways, which would prevent erosion, and more fencing around the rock art.	Same as Alternative A.	Alternative B.

## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
VIII. Fire Management			
Full Suppression	Full Suppression	Limited Suppression	Alternatives B and C. The unit has been divided into 3 suppression zones. The preferred alternative for each zone is:
1. No specific equipment or fire-fighting restrictions.	1. No bulldozers on initial attack; use of bulldozers after the initial attack would be determined through the escape fire analysis.	1. Specific actions would be included in a limited suppression plan.	1. Zone 1 - Alternative B
2. Prescribed burns allowed.	2. Prescribed burns allowed.	2. Suppression would occur when the fire: <ul style="list-style-type: none"> <li>a. spreads or has the potential to exceed the size specified in the plan;</li> <li>b. threatens private property;</li> <li>c. threatens other nearby structures;</li> <li>d. threatens human life.</li> </ul>	2. Zone 2 - Alternative C
		3. Prescribed burns allowed.	3. Zone 3 - Alternative B
IX. Access			
The existing transportation system in the unit would be maintained.	Same as Alternative A.	Same as Alternative A.	Alternative A.
	Negotiations with landowners would be initiated to obtain consent for administrative access on the Copper Mountain Road.		Alternative B.
X. Wilderness			
Prevent multiple-use management would continue on the Copper Mountain MSA. It would be recommended as nonmutable for designation as wilderness.	The Copper Mountain MSA would be recommended as suitable for designation as wilderness and managed under BLM's Wilderness Management Policy.	Same as Alternative A.	Alternative A.

Shoshone National Forest



Map A-10  
Surface Ownership  
East Fork

# Appendices

## East Fork Management Unit

### Alternative A

#### I. Energy & Minerals

##### A. Oil and Gas

No new oil and gas leases would be issued within the management unit.

Exploration and development would be permitted on existing leases because they represent valid existing rights.

### Alternative B

The unit would be open to leasing, exploration and development. The following no-surface occupancy and seasonal restrictions would apply.

#### No-Surface Occupancy

No-surface occupancy would be used where needed to protect:

- 1) water quality, fisheries, and riparian areas;
- 2) sage grouse brooding areas (habitat);
- 3) soils on steep slopes;
- 4) threatened and endangered species;
- 5) significant cultural resources sites where data recovery methods cannot mitigate adverse impacts.

#### Seasonal Restrictions For Exploration Activities

Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are critical during most years are:

- 1) big game crucial winter range  
December-April

### Alternative C

The entire unit would be open for leasing, exploration and development under the following guidelines.

Known Geologic Structures (KGSs) and areas with high potential for occurrence for oil and gas

a. No seasonal restrictions except for those restrictions designed to protect threatened and endangered species.

b. The use of no-surface occupancy restrictions would be limited to those instances where it is necessary to protect nationally significant cultural and natural history resources or threatened and endangered plant and animal species.

### Preferred Alternative

Modified Alternative B. All oil and gas leases would include no-surface occupancy restrictions.

## Appendices

### Alternative A

- 2) elk winter range  
December-April
- 3) elk calving areas  
May-June
- 4) sage grouse nesting areas  
March-June
- 5) raptor nesting sites  
March-July

### Alternative B

### Alternative C

### Preferred Alternative

c. Production activities would be subject to specific placement and design of pads, roads and facilities to minimize acreage disturbed. Priority would be given to maximizing the economic recovery of the oil and gas resource.

d. Development plans would be required for operations within sensitive areas. These plans would have the potential to reduce aggregate road and pipeline construction costs as well as minimize adverse impacts on surface values.

e. Extensive surface and subsurface archaeological investigations would be undertaken in the areas where there is high potential for both oil and gas development and the occurrence of cultural resources. In this way, significant cultural resources in high-development areas would benefit from study and excavation in a rational, well-planned, cost-effective manner, rather than in a piecemeal, unorganized, case-by-case manner.

#### Areas with moderate potential for occurrence of oil and gas.

All restrictions (seasonal, subsurface occupancy, etc.) would be considered on a case-by-case basis.

Any restrictions imposed on exploration and production activities would be based on the need to avoid a significant adverse impact on another resource.

#### Areas with low potential for occurrence of oil and gas.

##### No-Surface Occupancy

- No Surface Occupancy restrictions would be used where needed to protect:
- 1) water quality, fisheries, and riparian areas;
  - 2) sage grouse breeding areas (leks);
  - 3) soils on steep slopes;

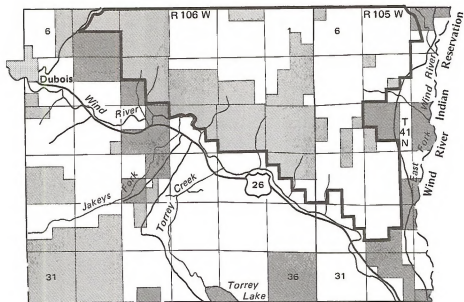
## Appendices

Alternative A	Alternative B	Alternative C	Preferred Alternative
		<p>4) threatened and endangered species;</p> <p>5) significant cultural resources sites where data recovery methods cannot mitigate adverse impacts.</p> <p><u>Seasonal Restrictions for Exploitation Activities</u></p> <p>Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the seasonal periods of time that are crucial during most years are:</p> <ol style="list-style-type: none"> <li>1) big game crucial winter range December-April</li> <li>2) elk winter range December-April</li> <li>3) elk calving areas May-June</li> <li>4) sage grouse nesting areas March-June</li> <li>5) raptor nesting sites March-July</li> </ol>	
<p><b>B. Locatable Minerals</b></p> <p>The management unit would be open for exploration and development of locatable minerals (except for those areas already withdrawn from mineral entry).</p>	<p>The remainder of the management unit would be closed to exploration and development of locatable minerals (requiring a withdrawal).</p>	<p>The management unit would be open for exploration and development of locatable minerals (requiring revocation of the existing withdrawal).</p>	Alternative B.
<p><b>II. Fish and Wildlife</b></p> <p>Habitat would be managed with first priority to support wintering elk. Cooperative habitat improvement projects would be developed with WFO.</p>	Same as Alternative A.	Same as Alternative A.	Alternative A.
<p><b>III. Forest Management</b></p> <p>Some harvesting would occur to improve or maintain elk habitat.</p>	Same as Alternative A.	Same as Alternative A.	Alternative A.
<p><b>IV. Landownership Adjustments and Utility Systems</b></p> <p>No lands would be sold or exchanged under this alternative.</p>	Same as Alternative A.	Four tracts of isolated public land encompassing about 861 acres would be considered for disposal through land exchanges or public sales.	Modified Alternative C. The 4 tracts (900 acres) would be retained in public ownership except that they would be considered for exchange only to either the Blanding Game and Fish Department or the U.S. Fish and Wildlife Service if the tract were to be used for management of elk winter range.
<p>Recreation and public purpose projects would be limited on a case-by-case basis.</p>	Same as Alternative A.	Same as Alternative A.	Alternative A.
<p>No major utility systems would be altered.</p>	Same as Alternative A.	Same as Alternative A.	Alternative A.
<p><b>V. Recreation</b></p> <p>No special management actions would be taken.</p>	Same as Alternative A.	Same as Alternative A.	Alternative A.

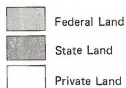
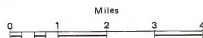
## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
<p>VI. Off-Road Vehicles</p> <p>There would be no off-road vehicle designations.</p>	<p>The entire unit would be limited to designated roads and vehicle routes with seasonal closures to traffic from December 1 through May 1.</p>	<p>Vehicular traffic would be limited to existing roads and vehicle routes.</p>	<p>Alternative C.</p>
<p>VII. Cultural/Natural History</p> <p>No special management actions would be taken.</p>	<p>Same as Alternative A.</p>	<p>Same as Alternative A.</p>	<p>Alternative A.</p>
<p>VIII. Fire Management</p> <p>Full Suppression</p> <ol style="list-style-type: none"> <li>1. No specific equipment or fire-fighting restrictions.</li> <li>2. Prescribed burns allowed.</li> </ol>	<p>Full Suppression</p> <ol style="list-style-type: none"> <li>1. No bulldozers on initial attack; use of bulldozers after the initial attack would be determined through the escape fire analysis.</li> <li>2. Prescribed burns allowed.</li> </ol>	<p>Limited Suppression</p> <ol style="list-style-type: none"> <li>1. Specific actions would be included in a limited suppression plan.</li> <li>2. Suppression would occur when the fire:               <ol style="list-style-type: none"> <li>a. spreads or has the potential to exceed the size specified in the plan;</li> <li>b. threatens private property;</li> <li>c. threatens other resource structures;</li> <li>d. threatens human life.</li> </ol> </li> <li>3. Prescribed burns allowed.</li> </ol>	<p>Alternative A.</p>
<p>IX. Access</p> <p>The existing transportation system would be maintained.</p>	<p>Same as Alternative A.</p>	<p>Same as Alternative A.</p>	<p>Alternative A.</p>





Shoshone National Forest

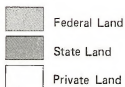
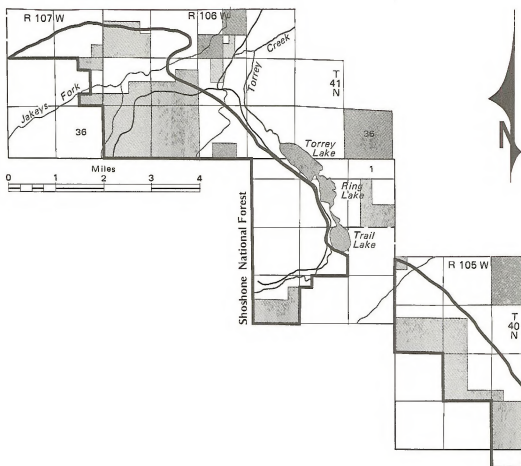


Map A-11  
Surface Ownership  
Dubois Badlands



## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
II. Fish and Wildlife			
Existing wildlife/fisheries habitat improvement projects would be maintained. Improvement projects (to enhance and improve wildlife/fisheries resources) would be completed after interdisciplinary and environmental review.	Same as Alternative A.	Same as Alternative A.	Alternative A.
III. Forest Management			
Because of the limited nature of forest resources, no special management actions would be taken.	Same as Alternative A.	Same as Alternative A.	Alternative A.
IV. Landownership Adjustments and Utility Systems			
No lands would be sold or exchanged under this alternative.	Same as Alternative A.	Three isolated tracts of public land, encompassing about 300 acres, would be considered for disposal through land exchanges or public sales.	Modified Alternative C. To consider disposal of the 3 tracts (300 acres), preferably through exchange.
Recreation and public purpose projects would be issued on a case-by-case basis.	Same as Alternative A.	Same as Alternative A.	Alternative A.
Public lands would be open for utility systems on a closed basis. These systems would be concentrated in existing utility corridors whenever possible.	No major utility systems would be routed through the area.	Same as Alternative A.	Modified Alternative B. The unit would be avoided for major utility systems.
V. Recreation			
No special management actions would be taken.	Same as Alternative A.	Same as Alternative A.	Alternative A.
VI. Off-Road Vehicles			
No off-road vehicle designations would be made.	The entire unit would be closed to off-road vehicle use.	Limit vehicle use to designated roads and trails and close unit between December 1 and April 30.	Alternative B.
VII. Cultural/Natural History			
No special management actions would be taken.	Same as Alternative A.	Same as Alternative A.	Alternative A.
VIII. Fire Management			
Full Suppression	Full Suppression	Limited Suppression	Alternative A.
1. No specific equipment or firefighting restrictions. 2. Prescribed burns allowed.	1. No ballistics or initial attack use of ballistics after the initial attack would be determined through the escape fire analysis. 2. Prescribed burns allowed.	1. Specific actions would be included in a limited suppression plan. Suppression would occur when the fire: a. exceeds or has the potential to exceed the size specified in the plan; b. threatens private property; c. threatens other natural resources; d. threatens human life. 3. Prescribed burns allowed.	
IX. Access			
The existing transportation system would be maintained.	Same as Alternative A.	Same as Alternative A.	Alternative A.



Map A-12  
Surface Ownership  
Whiskey Mountain

# Appendices

## WISKEY MOUNTAIN MANAGEMENT UNIT

Alternative A	Alternative B	Alternative C	Preferred Alternative
<p>I. Energy &amp; Minerals</p> <p>A. Oil and Gas</p> <p>The unit would remain closed to leasing, exploration and development.</p>	<p>The unit would be open to leasing, exploration and development. The following non-surface occupancy and seasonal restrictions would apply.</p> <p><u>Non-surface Occupancy</u></p> <p>Non-surface occupancy would be used where needed to protect:</p> <ol style="list-style-type: none"> <li>1) water quality, fisheries, and riparian areas;</li> <li>2) sage grouse breeding areas (Idaho);</li> <li>3) soils on steep slopes; threatened and endangered species;</li> <li>4) significant cultural resource sites where data recovery methods cannot mitigate adverse impacts.</li> </ol> <p><u>Seasonal Restrictions For Reclamation Activities</u></p> <p>Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are critical during most years are:</p> <ol style="list-style-type: none"> <li>1) big game crucial winter range December-April</li> <li>2) elk winter range December-April</li> <li>3) elk calving areas May-June</li> <li>4) sage grouse nesting areas March-June</li> <li>5) raptor nesting sites March-July</li> </ol>	<p>The entire unit would be open for leasing, exploration and development under the following guidelines.</p> <p><u>Known Geologic Structures (Fissures) and areas with high potential for occurrence for oil and gas</u></p> <ol style="list-style-type: none"> <li>a. No seasonal restrictions, except for those restrictions designed to protect threatened and endangered species.</li> <li>b. The use of non-surface occupancy restrictions would be limited to those instances where it is necessary to protect nationally significant cultural and natural history resources or threatened and endangered plant and animal species.</li> <li>c. Production activities would be subject to specific placement and design of pads, roads, and facilities to minimize acreage disturbed. Priority would be given to maintaining the economic recovery of the oil and gas resources.</li> <li>d. Development plans would be required for operations within sensitive areas. These plans would have the potential to reduce aggregate road and pipeline construction costs, as well as minimize adverse impacts on surface values.</li> </ol>	<p>Alternative A.</p>

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### Alternative A

### Alternative B

### Alternative C

### Preferred Alternative

e. Extensive surface and subsurface archaeological investigations would be undertaken in the areas where there is high potential for both oil and gas development and the occurrence of cultural resources. In this way, significant cultural resources in high development areas would benefit from study and excavation in a rational, well-planned, cost-effective manner, rather than in a piecemeal, unorganized, case-by-case manner.

#### Areas with moderate potential for occurrence of oil and gas.

All restrictions (seasonal, non-surface occupancy, etc.) would be considered on a case-by-case basis.

Any restrictions imposed on exploration and production activities would be based on the need to avoid a significant adverse impact on another resource.

#### Areas with low potential for occurrence of oil and gas

##### No-Surface Occupancy

No Surface Occupancy restrictions would be used where needed to protect:

- 1) water quality, fisheries, and riparian areas;
- 2) sage grouse brooding areas (leks);
- 3) soils on steep slopes;
- 4) threatened and endangered species;
- 5) significant cultural resource sites where data recovery methods cannot mitigate adverse impacts.

##### Seasonal Restrictions For Exploration Activities

Seasonal restrictions would be used where needed to protect crucial wildlife habitat.

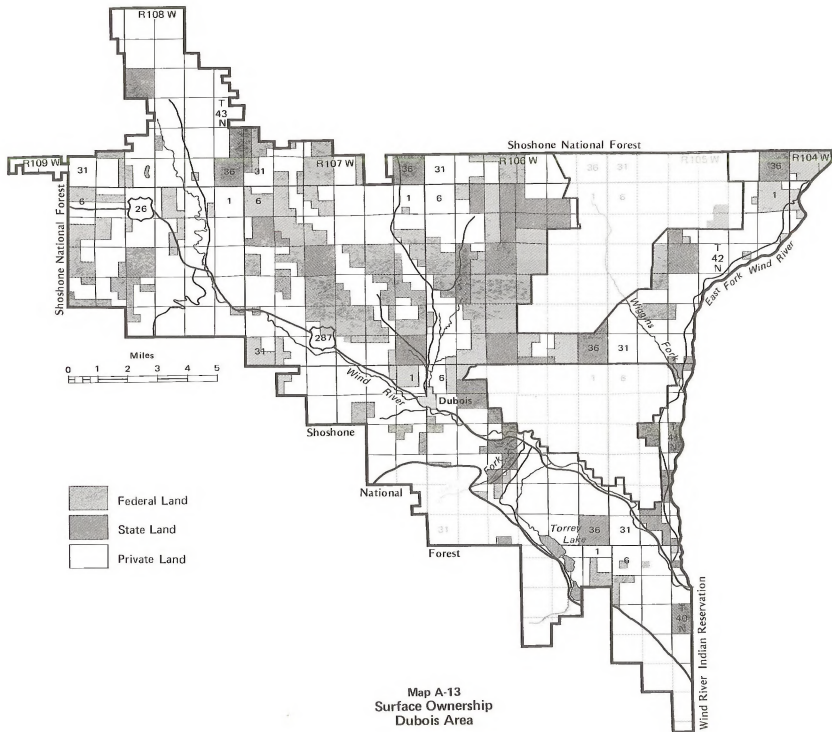
## Appendices

Alternative A	Alternative B	Alternative C	Preferred Alternative
		areas. The areas and the general periods of time that are crucial during most years are:	
		1) big game crucial winter ranges December-April	
		2) elk winter range December-April	
		3) elk calving areas May-June	
		4) sage grouse nesting areas March-June	
		5) riparian nesting sites March-July	
<b>B. Locatable Minerals</b>			
The unit would be open for exploration and development of locatable minerals, except for the 2,600 acres that are presently segregated from mineral development.	The entire unit would be closed for exploration and development of locatable minerals (excluding a mineral withdrawal).	The unit would be open for exploration and development of locatable minerals.	Alternative B.
<b>II. Fish and Wildlife</b>			
First priority is to provide for the requirements of wintering biggame sheep and other wildlife, as consistent with the purposes of the Wasley Mountain Biggame Sheep Winter Range. A variety of proposed habitat improvement actions, including the following, would be completed:	Same as Alternative A.	Same as Alternative A.	Alternative A.
Based on results of Wasley Mountain Rehabilitation Study project, projects to increase forage production and desirable plant species composition on preferred sites will be implemented on 200 to 600 acres.	Same as Alternative A.	Same as Alternative A.	Alternative A.
Fertilization, snow fencing, seeding, pitting, and use of herbicides to reduce mat forming forbs are among the potential treatments.			
In order to avoid/lessen biggame habitat use of present preferred sites, prescribed burns will be used to encourage herbaceous forage use and encourage sheep movement. Ditching, salting, and where appropriate, water development will be used to attract biggame into desired areas.	Same as Alternative A.	Same as Alternative A.	Alternative A.
The Wyoming Game and Fish Department, with cooperation of BLM and Forest Service, will utilize trapnets and crossplanting of superior biggame and elk hunting to control big game populations and forage use levels on the winter range.	Same as Alternative A.	Same as Alternative A.	Alternative A.
The major objective of the above actions are to maintain levels of forage utilization on the preferred winter range sites to 55% or less on a 5-year average.	Same as Alternative A.	Same as Alternative A.	Alternative A.
All existing habitat improvement projects that meet their objectives will be maintained by the cooperating agencies.	Same as Alternative A.	Same as Alternative A.	Alternative A.
<b>III. Forest Management</b>			
Harvestable timber stands are limited in this unit. Therefore, sales would be considered on a case-by-case basis and coordinated with the section committee.	Same as Alternative A.	Same as Alternative A.	Alternative A.



## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
<p>IV. <u>Landownership Adjustments and Utility Systems</u></p> <p>No lands would be sold or exchanged under this alternative.</p> <p>Recreation and public purpose permits would be issued on a county-wide basis.</p> <p>Public lands would be open for utility systems on a demand basis. These systems would be concentrated in existing utility corridors whenever possible.</p> <p>V. <u>Recreation</u></p> <p>No special management actions would be taken.</p> <p>VI. <u>Off-Road Vehicles</u></p> <p>No off-road vehicle designations would be made.</p> <p>VII. <u>Cultural/Natural History</u></p> <p>No special management actions would be taken.</p> <p>VIII. <u>Fire Management</u></p> <p>Full Suppression</p> <ol style="list-style-type: none"> <li>1. No specific equipment or firefighting restrictions.</li> <li>2. Prescribed burns allowed.</li> </ol> <p>IX. <u>Access</u></p> <p>The existing transportation system in the unit would be maintained.</p>	<p>Have the Bighorn Sheep Interagency Technical Committee analyze and recommend desirable landownership adjustments and alternatives. Have the three agencies review and decide on options to pursue where noncooperators are involved, i.e., with exchanges. Proceed with ownership adjustments where possible and appropriate.</p> <p>Same as Alternative A.</p> <p>Same as Alternative A.</p> <p>Same as Alternative A.</p> <p>Cooperate with Game and Fish on visitor use management for pothunting season wildlife observations.</p> <p>Seasonal closures would be used in some areas; other areas would be closed all year, and some areas would remain open for viewing the bighorn sheep. (Limited to designated roads and vehicle routes with seasonal road closures.)</p> <p>Same as Alternative A.</p> <p>Full Suppression</p> <ol style="list-style-type: none"> <li>1. No closures on initial attack; use of closures after the initial attack would be determined through the escape fire analysis.</li> <li>2. Prescribed burns allowed.</li> </ol> <p>Same as Alternative A.</p>	<p>Two tracts of isolated public land, encompassing about 890 acres, would be considered for disposal through land exchange or public sales.</p> <p>Same as Alternative A.</p> <p>Public lands would be closed for utility systems.</p> <p>Same as Alternative A.</p> <p>Same as Alternative A.</p> <p>The unit would be designated as open to off-road vehicles.</p> <p>Same as Alternative A.</p> <p>Limited Suppression</p> <ol style="list-style-type: none"> <li>1. Specific actions would be included in a limited suppression plan.</li> <li>2. Suppression would occur when the fires:               <ol style="list-style-type: none"> <li>a. exceeds or has the potential to exceed the size specified in the plan;</li> <li>b. threatens private property;</li> <li>c. threatens other man-made structures;</li> <li>d. threatens human life.</li> </ol> </li> <li>3. Prescribed burns allowed.</li> </ol> <p>Same as Alternative A.</p>	<p>Alternative B.</p> <p>Alternative A.</p> <p>Alternative C.</p> <p>Alternative B.</p> <p>Alternative B.</p> <p>Alternative B.</p> <p>Alternative A.</p> <p>Alternative C.</p> <p>Alternative A.</p>







## Appendices

Alternative A	Alternative B	Alternative C	Preferred Alternative
		<u>Seasonal Restrictions For Exploration Activities</u>	
		Seasonal restrictions would be used where needed to protect crucial wildlife habitat areas. The areas and the general periods of time that are crucial during most years are:	
		1) big game crucial winter ranges December-April	
		2) elk winter range December-April	
		3) elk calving areas May-June	
		4) sage grouse nesting sites March-June	
		5) raptor nesting areas March-July	
<b>B. Locatable Minerals</b>			
The management unit would be open for exploration and development of locatable minerals (except for 190 acres in Kern Springs Canyon that is presently segregated.)	Same as Alternative A.	The unit would be open for exploration and development of locatable minerals.	Alternative A.
<b>II. Fish and Wildlife</b>			
Restoring wildlife/fisheries habitat improvements would be maintained. Improvement projects (to enhance and improve wildlife/fisheries resources) would be completed after interdisciplinary and environmental review.	Same as Alternative A.	Same as Alternative A.	Alternative A.
<b>III. Forest Management</b>			
Harvestable timber stands are limited in this unit. Therefore, sales would be considered on a case-by-case basis.	Same as Alternative A.	Same as Alternative A.	Alternative A.
<b>IV. Landownership Adjustments and Utility Systems</b>			
No lands would be sold or exchanged under this alternative.	Same as Alternative A.	Some isolated tracts of public land would be considered for disposal through land exchanges or public sales. There are 30 tracts encompassing approximately 5,300 acres.	Modified Alternative C. To retain 13 tracts (3,000 acres) to public ownership and consider disposal of 17 tracts (2,300 acres) through sale or exchange.
Recreation and public purpose permits would be issued on a case-by-case basis.	Same as Alternative A.	Same as Alternative A.	Alternative A.
Public lands would be open for utility systems on a demand basis. These systems would be concentrated in existing corridors whenever possible.	Same as Alternative A.	Same as Alternative A.	Alternative A.

## Appendices

<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Preferred Alternative</u>
V. <u>Accession</u>			
No special management actions would be taken.	Same as Alternative A.	Same as Alternative A.	Alternative A.
VI. <u>Off-Road Vehicles</u>			
The unit would be designated as open to off-road vehicle use.	The entire unit would be designated as limited to existing roads and vehicle routes.	Same as Alternative A.	Alternative B.
VII. <u>Cultural/Natural History</u>			
No special management actions would be taken.	A management plan for Warm Springs Canyon would be written following a stabilization feasibility study for the future.	Same as Alternative A.	Alternative B.
VIII. <u>Fire Management</u>			
Full Suppression	Full Suppression	Limited Suppression	Alternative A.
1. No specific equipment or firefighting restrictions.	1. No donors on initial attack; use of donors after the initial attack would be determined through the escape fire analysis.	1. Specific actions would be included in a limited suppression plan.	
2. Prescribed burns allowed.	2. Prescribed burns allowed.	2. Suppression would occur when the fire: <ul style="list-style-type: none"> <li>a. exceeds or has the potential to exceed the size specified in the plan;</li> <li>b. threatens private property;</li> <li>c. threatens other resources; or</li> <li>d. threatens human life.</li> </ul>	
IX. <u>Access</u>			
The existing transportation system in the unit would be maintained.	Same as Alternative A.	Same as Alternative A.	Alternative A.
	Negotiations with landowners would be initiated to obtain easements for public access on the Tappan Creek Road.		Alternative B.





## APPENDIX 2

# STANDARD PROTECTION REQUIREMENTS FOR SURFACE DISTURBING ACTIVITIES (ALSO STANDARD OIL AND GAS LEASE STIPULATIONS)

The following stipulations would be used, when appropriate:

and ephemeral water sources or may be limited to perennial surface water). These decisions, where possible, should be documented in the land use planning documents.

### SURFACE DISTURBANCE STIPULATION

Surface disturbance will be prohibited in any of the following areas or conditions, except when the District Manager authorizes development in the area following consideration of a detailed plan.

1. Slopes in excess of 25 percent.
2. Within important scenic areas (Class I and II Visual Resource Management areas).
3. Within 500 feet of surface water and/or riparian areas.
4. Within a quarter mile or visual horizon (whichever is closer) from a historic trail.
5. Construction during periods when the soil material is saturated, frozen, or when watershed damage is likely to occur.

### GUIDANCE

The SURFACE DISTURBANCE STIPULATION will be included on all lease parcels. The intent of this stipulation is to inform interested parties (potential lessees) that, when one or more of the five (a through e) environmental conditions exists, surface disturbing activities will be prohibited unless or until the lessee or his designated operator and the surface management agency (SMA) arrive at an acceptable plan for mitigation of anticipated impacts.

This negotiation will occur prior to development of the lease and become a condition for approval in the Application for Permit to Drill (APD).

Specific threshold criteria (e.g., 500 feet from water) have been established based upon the best information available. However, geographical areas and time periods of concern must be delineated at the field level (i.e., "surface water and/or riparian areas" may include both intermittent

### WILDLIFE STIPULATION

1. To protect important big game ungulate winter habitat, drilling and other surface disturbing activity will not be allowed during the period from November 15 to April 30 within certain areas encompassed by this lease. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this limitation in any year may be specifically authorized in writing by the District Manager.
2. To protect important raptor and/or sage and sharp-tailed grouse nesting habitat, drilling and other surface disturbing activity will not be allowed during the period from February 1 to July 31 within certain areas encompassed by this lease. This limitation does not apply to maintenance and operation of producing wells. Exception to this limitation in any year may be specifically authorized in writing by the District Manager.
3. No surface occupancy will be allowed on that portion of the lease within the area (**legal description**) for the purpose of protecting (e.g., **sage/sharp-tailed grouse strutting, elk calving, and/or other species activity**) habitat. Exceptions to this limitation in any year may be authorized in writing by the District Manager.

### GUIDANCE

The WILDLIFE STIPULATION is intended to provide two basic types of protection, seasonal restriction (a and b) and no surface occupancy (c). Legal descriptions will ultimately be required and should be measurable and legally definable. There are no minimum subdivision requirements at this time. The area delineated can and should be refined as necessary based upon current

## Appendices

biological data at the time the APD is processed. It should eventually become a condition for approval in the Application for Permit to Drill.

The seasonal restriction section of the stipulation identifies three groups of species and delineates two similar timeframe restrictions. These two restrictions are big game ungulate and raptors/grouse. The big game ungulates including elk, moose, deer, antelope, and big horn sheep all require protection of crucial winter range between November 15 and April 30. Raptors including eagles, accipiters, falcons, buteos, osprey, ferruginous hawks, burrowing periods between February 1 and July 31.

The no surface occupancy section of the stipulation is intended for protection of unique wildlife and wildlife habitat values (e.g., sage grouse strutting grounds, elk calving areas, known threatened and endangered species habitat, etc.) which cannot be protected using seasonal restrictions.

### SPECIAL RESOURCE PROTECTION STIPULATION

In order to protect (resource value), the District Manager reserves the right to prohibit surface disturbance (i.e., within a specific distance of the resource value or between date-to-date in (legal subdivision)). This limitation does not apply to operation and maintenance of producing wells. Exceptions to this limitation may be authorized by the District Manager.

Examples:

1. Recreation areas.
2. Special historic features.
3. Special management areas.
4. Sections of major rivers.
5. Prior existing rights-of-way.
6. Occupied dwellings.

### GUIDANCE

The SPECIAL RESOURCE PROTECTION STIPULATION is intended for use only in the few very specialized, site-specific situations where one of the other three general stipulations will not adequately address the concern. The resource value, location, and specific restriction must be

clearly identified. A detailed plan addressing mitigation and special restrictions on development will be required prior to the development of a lease and become a condition for approval in the Application for Permit to Drill.

### NO SURFACE OCCUPANCY STIPULATION

No surface occupancy will be allowed on the following described lands (legal subdivision/area) because of (resource value). See examples.

Examples:

1. Recreation areas (campgrounds, historic trails, national monuments).
2. Major reservoirs/dams.
3. Special management area (ACEC, wild and scenic rivers, etc).

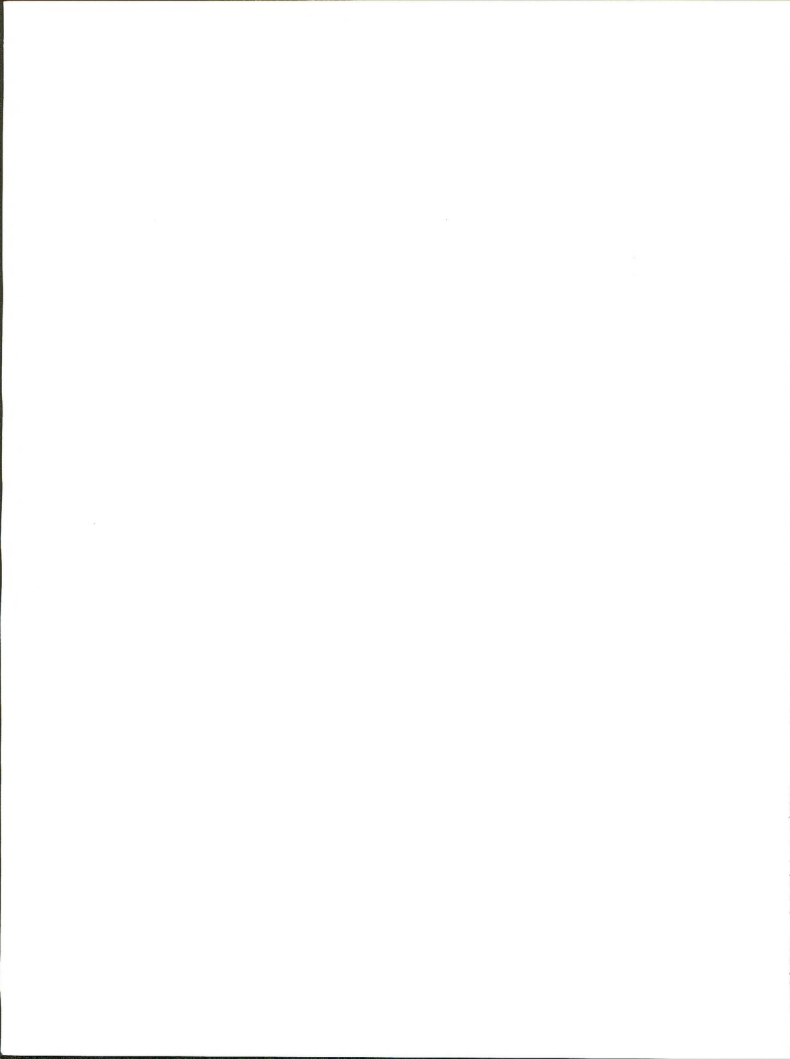
### GUIDANCE

The NO SURFACE OCCUPANCY STIPULATION (NSO) is intended for use only when other stipulations are determined insufficient to adequately protect the public interest and/or as an alternative to "no leasing." The legal subdivision and resource value of concern must be identified in the stipulation and be tied to a land use planning document. There will be no exceptions to this stipulation granted without modification in the appropriate land use plan or unless an exception is approved by W.S.O.

Washington Office guidance advises that when considering the no-lease option, a rigorous test must be met and fully documented in the record. This test must be based on the stringent standards of the Interior Board of Land Appeals. Since rejection of a lease offer is more severe than the most restrictive stipulation, the record must show that consideration was given to leasing subject to reasonable stipulations, including a NSO stipulation. The record must also show that stipulations were determined to be insufficient to adequately protect the public interest. A no-lease decision should not be made solely because it appears that directional drilling would be unfeasible, especially where a NSO lease may be acceptable to a potential lessee. In such cases the opportunity to accept or refuse a NSO lease should be left to the potential lessee. Exception(s) by the District Manager to the NSO stipulation will be subject

## Appendices

to the same test used to initially justify the imposition of this stipulation. If the NSO stipulation is justified, but upon development less restrictive stipulations would adequately protect the public interest, then an exception to the NSO stipulation could be granted. The record must show that because conditions and uses have changed, less restrictive stipulations will protect the public interest.



## APPENDIX 3

# SOCIOECONOMICS

### INTRODUCTION

The management actions described in this RMP are not expected to have meaningful impacts on the baseline socioeconomic conditions described in the Affected Environment portion of this document. As described in that chapter, the mining, retail trade and services sectors of the area economy provide the major sources of employment, as well as a substantial share of area wages. Other major sources of wages include construction, wholesale trade and public administration. These sectors should not be impacted by BLM's proposed management activities.

### Management Actions for Oil and Gas

Input and responses from oil and gas producers during the formulation and evaluation of all of the Lander RMP alternatives for the oil and gas leasing and development issues have indicated that no significant increases or decreases in geophysical exploration, drilling and development activities would result from any of the management plan alternatives. Consequently, no meaningful socioeconomic impacts would result from any of the proposed alternative oil and gas related management actions. Presently, oil and gas drilling increases at less than 2 percent per year. This growth rate is expected to continue for the next 60 years.

### Management Actions for Uranium and Other Minerals

Uranium activity in the Lander Resource Area is more dependent on the overall supply and demand conditions for uranium than on BLM management activities. Therefore, none of the proposed management alternatives should have measurable effects on local uranium activities.

Mining activities for phosphates, bentonite and zeolites are also dependent on general market conditions to encourage production rather than on BLM management activities. Iron ore produc-

tion in the area appears to be on a decline, and BLM activities are not expected to reverse or increase that trend.

### Management Actions for Fish and Wildlife

Management of fish and wildlife and resultant impacts, including impacts to recreational activities, are expected to be roughly the same throughout all alternatives. The Wyoming Game and Fish Department's desired levels of game populations are expected to be maintained under all alternatives, and hunting permit levels are estimated to be virtually the same under all alternatives as they presently are.

### Management Actions for Forestry

Table A-3-1 shows the 5-year proposed timber harvest levels under each alternative.

#### Alternative A

Potential economic and employment stability in the timber harvesting and milling communities depend substantially on the consistency of annual levels of harvested and milled timber. As shown in tables A-3-1 and A-3-2, Alternative A provides consistent harvesting and milling levels over the life of the analysis. Therefore, it also provides relatively consistent annual employment opportunities and input to business activity.

As shown on tables A-3-2, present harvesting practices produce sawlog and other timber products with an annual stumpage value of roughly \$213,000. This timber harvesting activity has a trickle-down ripple effect that contributes about \$283,000 to total regional business activity and \$230,000 to total regional income. In addition to the impacts on the economy from timber harvesting, output from woodmilling (processing) in the area has an annual value of about \$500,000. Subsequently, wood processing's ripple effects on the economy further raises annual regional business activity by slightly over \$861,000. These

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**TABLE A-3-1**  
**PROPOSED TIMBER HARVEST**

Subject	Alternatives							
	A <sup>1</sup>		B		C		Preferred	
	Sawlogs	Other Timber	Sawlogs	Other Timber	Sawlogs	Other Timber	Sawlogs	Other Timber
1. Harvesting totals over 40 years by 5-year sequences (MMBF) <sup>2</sup>								
Years 1 through 5	6.5	8.5	50	10	20	10	15.5 <sup>4</sup>	15.5
Years 6 through 10	6.5	8.5	50 <sup>3</sup>	10	20	10	10.5 <sup>7</sup>	15.5
Years 11 through 15	6.5	8.5	None	10	20 <sup>4</sup>	10	10.5 <sup>7</sup>	15.5
Years 16 through 20	6.5	8.5	None	10	5	10	5.5 <sup>8</sup>	15.5
Years 21 through 25	6.5	8.5	None	10	5	10	5 <sup>9</sup>	15.5
Years 26 through 30	6.5	8.5	None	10	5	10	5 <sup>9</sup>	15.5
Years 31 through 35	6.5	8.5	None	10	5	10	5.5 <sup>8</sup>	15.5
Years 36 through 40	6.5	8.5	None	10	5	10	5 <sup>9</sup>	15.5
<b>Total</b>	<b>52.0</b>	<b>68.0</b>	<b>100</b>	<b>80</b>	<b>85</b>	<b>80</b>	<b>49.0</b>	<b>124.0</b>

<sup>1</sup> This alternative is the same as existing management and is the sustained yield level of harvest.

<sup>2</sup> This type of sequence is chosen because timber management actions occur on this same time frame.

<sup>3</sup> The average time that sawlogs can be harvested in the resource area before the big timber is depleted is expected to be 10 years under this alternative. Regrowth would be required before harvesting could resume.

<sup>4</sup> Sawlog timber in the Green Mountain unit is expected to be depleted in 15 years from the beginning of activity under this alternative. However, other units in the resource area would continue to provide 1 MMBF/year. Regrowth would be required on Green Mountain before harvesting could resume.

<sup>5</sup> Under this alternative, Green Mountain sawlog timber is expected to be depleted in 15 years, requiring regrowth before harvesting could resume there. In Lander Slope, sawlog harvesting would occur in cycles of 5 years with 10-year rest periods between them. About .1 MMBF/year of sawlogs would be harvested on a continuous basis from the remainder of the resource area.

<sup>6</sup> Contains 5 years' harvests from all timber units in the resource area.

<sup>7</sup> Contains 5 years' harvests from all timber units except Lander Slope.

<sup>8</sup> Contains 5 years' harvests from all timber units except Green Mountain.

<sup>9</sup> Contains 5 years' harvests from all timber units except Lander Slope and Green Mountain.

wood processing impacts for the area assume that timber harvested in the area is also milled there, and that wages paid to employees in harvesting and milling is spent within the resource area.

### Alternative B

All alternatives, except Alternative B, have at least some sawlog harvesting each year. However, under Alternative B, all harvestable timber would be cut in the first 10 years of the 40-year period under analysis. As a result, Alternative B would provide the largest potential financial return to the timber harvesting sector because early-year harvests, hypothetically, provide more opportunity for the financial returns from timber harvesting to be reinvested in other money making activities over time.

In other words, a dollar earned in the present is worth more than the same dollar earned in the future. See table A-3-3 and A-3-4). However, this alternative has adverse community and employment impacts because local sawlog output ends after 10 years. This, subsequently, would decrease employment related to sawlog harvesting, and unless sawlogs are then imported to supply local sawmills, it also decreases sawmill employment.

### Alternative C

Alternative C increases sawlog harvesting during the first 15 years of the analysis period, then reduces these levels to less than those under present management. As a result, during the first 15 years of the analysis period, harvesting and related milling activities raise annual regional business activity by nearly \$1.7 million above the \$861,000 presently attributed to timber and woodmilling. However, the proposed subsequent drop in sawlog output in the last 30 years of the analysis period would lower annual regional business activity about \$200,000 below present levels. Concurrently, regional employment related to the timber industry would rise by about 130 to 135 persons, during the first 15 years but would decline about 15 persons below present levels after that period. In reviewing the tables mentioned above, the reader should remember that dollar returns are realized anew for each 5-year period considered, but the employment figure recorded is a one-time adjustment to the new level, where it should remain unless some other activity adjustment changes it.

### Preferred Alternative

The preferred alternative has proposed numerous output fluctuations. It projects a decline in sawlog output during the first 20 years of the analysis period. By the end of these 20 years, harvesting would be slightly below present annual levels, and over the following 10 years it would drop to only .1 MMBF per year. In 30 years, the annual cut once again would rise to near present levels, but in 36 years it would drop back to .1 MMBF per year. This type of fluctuation results in the total annual business activity created by milling and sawlog activities declining from roughly \$2 million at the start of the program to under \$100,000 during years when only .1 MMBF of sawlogs are harvested. Conversely, like alternatives B and C, the preferred alternative projects higher harvesting levels than for present management timber products other than sawlogs, but these products do not generate as great an impact on business activity and employment as sawlog output and milling.

### Alternative A Versus the Preferred Alternative

Over the 40-year analysis period, the preferred alternative would result in almost \$2 million less in milling related regional business activity than would Alternative A. However, over this same 40-year period, the preferred alternative would encourage about \$825,000 more in timber harvesting related regional business activity than would Alternative A.

Although specific groups within the areas would be expected to suffer impacts from the preferred alternative, impacts to the total region should be minimal because the timber/milling portion of regional business activity is small. In 1980, total regional business activity from all sectors was \$6 billion.

Comparing regional employment impacts between Alternative A and Alternative B over the 40-year period, indicates that Alternative B would probably result in job declines of about 5 to 6 percent over present levels, most of which would occur in the timber processing sector. To the region as a whole, it would be an insignificant decline that could easily be absorbed. To certain communities heavily dependent on the timber harvesting and milling activities, impacts maybe more traumatic.



## Appendices

**TABLE A-3-2**  
**ECONOMIC IMPACTS OF PRESENT**  
**TIMBER HARVESTING LEVELS**

	Units	Level
1. Present harvesting levels:		
Sawlogs	MMBF	1.30
Other	MMBF	1.70
2. Gross value of output <sup>1</sup>	\$1,000	213.00
3. Portion of gross value - that is value added <sup>2</sup>	\$1,000	135.00
4. Impact on regional business activity <sup>3</sup>	\$1,000	283.00
5. Direct general income related to timber output <sup>4</sup>	\$1,000	83.00
6. Direct, indirect and induced impacts on general income related to timber output <sup>5</sup>	\$1,000	230.00
7. Direct impacts on personal income <sup>6</sup>	\$1,000	40.00
8. Direct and indirect impact on personal income <sup>7</sup>	\$1,000	45.00
9. Direct, indirect and induced impacts on personal income <sup>8</sup>	\$1,000	61.00
10. Direct impacts on job numbers <sup>9</sup>	Numbers	2.90
11. Total impact on job numbers <sup>10</sup>	Numbers	8.16

<sup>1</sup> Assumes 417 per MBF for sawlogs and \$12 per MBF for other.

<sup>2</sup> Gross value added includes the portion of output value attributed to employee compensation, property tax, income and indirect business tax. In the Lander Resource Area, it is estimated to be 63.46 percent. Source: U.S. Forest Service Implan I/O.

<sup>3</sup> Derived by multiplying the output value times the Type II business multiplier 1.3308. Source: same as in number 2.

<sup>4</sup> Calculated by multiplying .6158 times gross value added. Source: same as number 2.

<sup>5</sup> Derived by multiplying the Type II income multiplier 1.7063 times gross value added. Source: same as in number 2.

<sup>6</sup> Estimated that 18.7 percent of output value in Lander Resource Area contributes directly to personal income. Therefore, .187 was multiplied times gross output value. Source: same as number 2.

<sup>7</sup> The Type I multiplier 1.1345 was multiplied times direct personal income. Source: same as number 2.

<sup>8</sup> The Type II multiplier 1.5254 was multiplied times direct personal income. Source: same as number 2.

<sup>9</sup> Derived by multiplying 0.0136872 times each \$1,000 of output value. Source: same as number 2.

<sup>10</sup> Derived by multiplying Type II multiplier 2.8125 times the direct job numbers.

**TABLE A-3-3**  
**GROSS VALUE OF PROPOSED TIMBER HARVEST**

Subject	Alternatives							
	A <sup>1</sup>		B		C		Preferred	
	Sawlogs	Other Timber	Sawlogs	Other Timber	Sawlogs	Other Timber	Sawlogs	Other Timber
1. Gross value of potential harvest. Totals for each 5-year period and for 40 years. <sup>2</sup> (\$1,000)								
Years 1 through 5	110.5	102	850	120	340	120	263.5	186
Years 6 through 10	110.5	102	850	120	340	120	178.5	186
Years 11 through 15	110.5	102	None	120	340	120	178.5	186
Years 16 through 20	110.5	102	None	120	85	120	93.5	186
Years 21 through 25	110.5	102	None	120	85	120	8.5	186
Years 26 through 30	110.5	102	None	120	85	120	8.5	186
Years 31 through 35	110.5	102	None	120	85	120	93.5	186
Years 36 through 40	110.5	102	None	120	85	120	8.5	186
<b>Subtotal</b>	<b>1,884.0</b>	<b>816</b>	<b>1,700</b>	<b>960</b>	<b>1,445</b>	<b>960</b>	<b>833.0</b>	<b>1,448</b>
2. Grand Total: Sawlogs and Other		1,700		2,660		2,405		2,321

<sup>1</sup> This alternative is the same as existing management and is the sustained yield level of harvest.

<sup>2</sup> Based on a market price of \$17 per MBF for sawlogs and \$12 per MBF (\$6 per cord) for other timber. Price assumed to remain constant over time. Values calculated do not reflect deductions for costs of management and sale of timber, nor costs (of whatever kind) to other area resources or resource uses.

## Livestock Grazing

The preferred alternative from the Green Mountain and Grazing Supplement have been adopted for this RMP as common to all alternatives. Implementation of these proposed actions would have negligible regional socio-economic impacts. The agricultural/livestock sector does not employ many external workers. A large portion of ranch employment is composed of family labor. Also, the crop/livestock sector represents less than 2 percent of regional business activity.

Any measurable impacts from changes in allotment use would be experienced by individual ranch operators. The intensity of the impact to an individual operator would be proportional to its dependency on public land. The preferred alternative was selected for Green Mountain and Gas Hills because it was regarded as the best management option in the given multiple-use management scheme and because any related adverse impacts would be moderated in the long term.

TABLE A-3-4

### FUTURE AND PRESENT VALUE OF PROPOSED TIMBER HARVEST

Subject	Alternatives			Preferred
	A <sup>1</sup>	B	C	
1. Future value of timber values Totals for each 5-year period and for 40 years. (\$1,000)				
Years 1 through 5	3,547.14	16,191.63	7,678.51	7,503.24
Years 6 through 10	2,372.64	10,830.41	5,136.07	4,069.78
Years 11 through 15	1,587.04	896.21	3,435.47	2,722.23
Years 16 through 20	1,061.55	599.46	1,024.09	1,396.25
Years 21 through 25	710.06	400.98	685.00	649.91
Years 26 through 30	474.95	268.21	458.19	434.72
Years 31 through 35	317.69	179.40	306.48	417.86
Years 36 through 40	212.50	120.00	205.00	194.50
<b>Grand Total</b>	<b>10,283.57</b>	<b>29,486.30</b>	<b>18,926.81</b>	<b>17,388.49</b>
2. Present Value of Potential <sup>2</sup> 40-year earning stream (\$1,000)	412.08	1,181.56	758.51	696.78

<sup>1</sup> Each of the values was compounded at an annual rate of 8.375 percent. This rate is designated from economic analyses in federal studies by the Water Resources Council. The compounding for each 5-year period ran from the end of that period to the end of the 40-year analysis time frame. This assumes available investment possibilities at 8.375 percent for potential timber returns.

<sup>2</sup> The grand total future values listed in section 1 of this table were discounted back over the 40 years to the present at a discount rate of 8.375 percent, the rate specified by the Water Resource Council. Because of how future value was calculated, this gives the same result as discounting by period then summing results across periods.

## Summary

None of the proposed alternatives would have meaningful impacts on the region under consideration. Various timber alternatives could impact communities, business, and individuals directly concerned with timber harvesting and/or milling, but in the broader regional picture, these impacts would be insignificant.

Some individual ranchers might feel the impacts from various grazing actions, but these impacts would not be meaningful to the area as a whole.

No measurable impacts related to the RMP alternatives are traceable to the recreation or minerals sectors of the region.

None of the impacts that might occur to the timber or livestock sectors are regarded as irreversible. There may be cases where individual persons or operators may have possible short-term losses under some alternatives that would be difficult, if not impossible, to retrieve. Since most of the livestock grazing actions are planned in conjunction with operator cooperation, impacts are not envisioned to be significant, even for individual operators in this sector.

# GLOSSARY

- AMBIENT.** The surrounding, circulating air.
- ANIMAL UNIT MONTH.** The amount of forage required by an animal unit for 1 month; tenure of one animal unit for a period of 1 month.
- AQUIFER.** A rock or soil that contains and transmits water and consequently is a source for groundwater.
- ARTIFICIAL REGENERATION.** Reforestation of a cutover or burned area by planting seedlings or by direct seeding of an area by hand or from the air.
- BASIN.** A loose abbreviation for intermontaine basin, bolson, or semi-bolson. Also, an area of centripetal drainage or a structural depression.
- BEHAVIORAL AVOIDANCE ZONE.** An area or acreage of a wildlife species habitat surrounding or adjacent to the site of a human activity or disturbance which remains physically intact but is rendered partially or entirely unusable to the species, as a result of its natural behavioral tolerance limits.
- BOLSON.** A specific identification for an internally drained intermountaine basin.
- BOARD FOOT.** A measurement of the volume of a tree which is based on a block of wood one foot on each side and one inch thick.
- BRECCIA (Volcanic).** A more or less indurated pyroclastic rock consisting chiefly of accessory and accidental angular ejecta 32 mm or more in diameter lying in a fine tuff matrix.
- BROWSE.** The tender shoots, twigs, and leaves of trees and shrubs often used as food by domestic and wild ungulates; to feed or eat on browse.
- CLEARCUT.** A harvest cutting of a stand of trees in which all trees are removed from a specified area.
- CLIMAX VEGETATION.** The highest ecological development of a plant community that is capable of being perpetuated under the prevailing climatic and soil conditions.
- COMMERCIAL THINNING.** A silvicultural practice to remove a specified number of trees from a stand of trees which is growing too closely together. This operation, as in a precommercial thinning, usually leaves a specified number of trees on an area at a specified spacing interval. This is to transfer the growth potential of the land onto a few of the best trees. This operation is usually conducted in a stand of larger trees, and a value is placed on the trees to be removed. Normally, the contractor doing the work will remove the products from the trees removed and sell them.
- COMMERCIAL TIMBERLAND (Productive Forest Land).** A timber stand that has an annual average growth rate of at least 20 cubic feet per acre.
- COMMERCIAL SPECIES.** A species of tree that is of high enough quality and quantity in an area to be in demand for commercial sales.
- CONTOUR FURROW.** A plowed or listered strip on a contour line for the purpose of water retention.
- CONVENTIONAL LOGGING METHODS OR SYSTEMS.** Logging an area utilizing presently standardized equipment normally used in that specific area. In this location, it is meant as using rubber-tired skidders or tracked dozers to haul logs to a central location.
- CUBIC FOOT.** A measurement of the volume of a tree that is based on a block of wood one foot high, one foot wide, and one foot deep.
- CULTURAL RESOURCES.** Fragile and nonrenewable remains of human activity, occupation, or endeavor that are reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, or natural features.
- CULTURAL RESOURCE INVENTORY.** A descriptive listing and documentation, including photographs and maps, of cultural resources; included are the processes of locating, identifying, and recording sites, structures, building, objects, and districts through library and archival research, information from persons knowledgeable about cultural resources, and varying levels of intensity on-the-ground field surveys.
- DBH.** Diameter breast high - a measurement of the diameter of a tree at a point 4.5 feet above ground level on the uphill side of a tree.
- DEFERMENT.** Delaying or discontinuing livestock grazing on an area for the period of time needed for plant reproduction, new plant establishment, or vigor restoration of existing plants.
- DWARF MISTLETOE (*Arceuthobium americanum*).** This is a small parasitic plant, specific to certain tree species, which grows on the boles and branches of pine and lives from the tissues of the host tree.
- ECOSYSTEM.** A biological community, together with its physical environment, forming an interacting system inhabiting an identifiable space.
- ENDEMIC POPULATION (Mountain Pine Beetle).** A low level of beetle population that is usually present in any stand of pine. The population is usually kept in check and the beetles will generally only kill a few trees as long as the resistance of the trees to attack is high.
- EPIDEMIC POPULATION (Mountain Pine Beetle).** An uncontrolled population of beetles at which the resistance of the trees in a stand is overcome. At a certain point in population growth, the population explodes and will keep attacking trees as long as there is a large enough supply of trees to sustain them.
- EPHEMERAL STREAM.** A stream flowing only during and immediately after rainstorms or only for a short period after snow melt.
- EROSION.** The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.
- ESCAPED FIRE ANALYSIS.** Analysis conducted to determine the actions to be taken if a fire were to escape the initial attack procedures.
- FECAL COLIFORM BACTERIA.** Micro-organisms that are passed from animals in their feces.
- FORB.** An herb other than grass.
- FOREST DEVELOPMENT.** A program of silvicultural treatment to perpetuate and improve production of wood and related values. It includes such treatments as site preparation, seeding, planting, and protective measures.
- FORESTLAND.** Land that is now, or is capable of becoming, at least 10 percent stocked with forest trees, which has been developed for nontimber use.
- GAME DRIVE LINE.** Recognizable cultural resource utilized to herd and direct game animals into an area where they are more easily killed or captured.
- GNISS.** A metamorphized granite.
- GRANITE.** A visibly crystalline plutonic rock with granular texture; composed of quartz and alkali feldspar with subordinate plagioclase and biotite and hornblende.
- GROUNDWATER.** Water confined below the surface of the earth in an aquifer or as soil.

## Glossary

- GULLY.** A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.
- HEADING OUT.** When the majority of individuals of a plant species in an area has begun producing flower heads.
- HERBACEOUS VEGETATION.** Plants without a persistent woody stem above ground.
- IGNEOUS.** Rocks formed by solidification of hot mobile material called magma.
- INTENSIVE TIMBER MANAGEMENT.** The practice of converting an unregulated forest into a maintained and managed forest that will approach the desired or optimum level of growing stock as rapidly as possible. This is achieved by such practices as precommercial and commercial thinning, large-scale site preparation, planting, brushland hardwood control, fertilization, and forest genetic improvements.
- INTERMITTENT STREAM.** A stream that is dry for a large part of the year, ordinarily for more than three months.
- KNOWN GEOLOGIC STRUCTURE.** The trap in which an accumulation of oil or gas has been discovered by drilling and determined to be productive, the limits of which include all acreage that is presumptively productive.
- LITHIC QUARRY.** A cultural resource site exhibiting the procurement of raw stone materials for use by human groups.
- LITHIC SCATTER.** A prehistoric site characterized by a scatter of stone tools and flakes that may indicate a number of functions.
- MBF.** A timber volume designation meaning one thousand board feet.
- MAGMA.** Naturally occurring mobile rock material, generated within the earth and capable of intrusion and extrusion, from which igneous rocks are considered to have been derived by solidification.
- MESOZOIC.** Pertaining to an era occurring between 70 million and 220 million years ago.
- MITIGATION.** A method or process by which impacts from actions may become less injurious to the environment.
- MMBF.** A timber volume designation meaning one thousand thousand (one million) board feet.
- MOUNTAIN PINE BEETLE.** A small ( $\frac{1}{4}$  inch long) beetle which feeds on the inner bark layer of a tree (lodgepole pine, limber pine, Ponderosa Pine) and which will eventually kill a tree or a number of trees if sufficient attacks are made on the tree or trees. The death of a tree results from the activity of the beetles, which cuts the supply of water and nutrient flow in the tree by severing the connective tissue.
- NATURAL REGENERATION.** Reforestation of a cutover or burned area by natural means (i.e., from seeds blown in from adjacent trees, from dormant seeds in the ground or from seeds dropped out of cones on the ground after logging).
- NONCOMMERCIAL FORESTLAND.** Land that is not capable of yielding at least 20 cubic feet of wood per acre, per year of commercial species; also, land that is capable of producing only noncommercial tree species.
- OROGRAPHIC EFFECT.** Precipitation resulting when moist air is forced to rise by mountain ranges or other land formations lying athwart the path of the wind.
- P<sub>2</sub>O<sub>5</sub>.** Phosphates of low-grade resources with 18 percent to 24 percent phosphorus peroxide or 39 percent to 52 percent bone phosphate of lime (B.P.L.).
- PALEONTOLOGY.** A science dealing with the life and past geological periods as known from fossil remains.
- PARENT MATERIAL.** The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.
- PARTIAL CUTTING.** A silvicultural system of logging in which only a portion of the trees on a given area are removed. Depending on the specific system, the remaining trees are usually left in fairly constant spacing pattern.
- PEGMATITE.** Those igneous rocks of coarse grain found usually as dikes associated with a large mass of plutonic rock of finer grain size.
- PERENNIAL STREAM.** A stream that flows throughout most of the year except in years of extreme drought.
- PETROGLYPH.** A figure or design carved, abraded, or pecked on rock.
- PHENOLOGY.** The study of periodic biological phenomenon such as flowering, seeding, etc., especially as related to climate.
- PICTOGRAPH.** A figure or design painted or drawn on rock.
- PIPING SOIL.** Pipes are essentially large subsurface open channels sometimes several meters in diameter. They form by the enlargement of voids and the dissolving of salts below the soil surface by water. Soils with high clay and sodium content are most susceptible.
- POLE STAND.** An area consisting of trees the average size of which is between 5.0 and 8.9 inches in diameter.
- PRECAMBRIAN.** The earliest era, ending 600,000,000 years ago, during which the earth's crust was formed and the first life appeared.
- PRECOMMERCIAL THINNING.** A silvicultural practice to remove a specified number of trees from a stand of young trees. This can be done by mechanical means (cutting with axe or saw or pushing over with tractors), or by chemical means (injecting unwanted trees with a poison), and usually leaves a specified number of trees per acre at a specified interval. This spacing interval is generally based on the age and size of the trees in the stand and is undertaken to transfer the growth potential of the land onto a few of the best trees on the site. In a precommercial thinning, no value is placed on the trees to be removed.
- RADIO-CARBON DATING.** The determination of the age of objects of plant or animal origin by measurement of the radioactivity of their carbon content. Used in archeology to date bone, wood, charcoal, and other organic remains associated with human activity.
- RANGE READINESS.** The defined stage of plant growth at which grazing could begin under a specific management plan without causing permanent damage to vegetation or soil. This term is usually applied to seasonal ranges.
- REGENERATION.** Tree seedlings that are established on an area, either naturally or artificially, following some event in the life of a mature stand, either a harvest cut, a fire, or some kind of disaster.
- REGULATED VOLUME.** A BLM designation for inventory purposes, including timber in the resource base which is alive or has been dead for less than 5 years.
- RELIEF.** The elevations or inequalities of a land surface, considered collectively.



## Glossary

- RILL.** Small, conspicuous water channel or rivulet that concentrates runoff; usually less than six inches deep.
- RIPARIAN.** Situate on or pertaining to the bank of a river, stream, or other body of water.
- ROTATION AGE.** The average age of a timber stand at which the trees are at their peak of growth and at the optimum point for harvesting.
- RUNOFF.** Precipitation that does not infiltrate the soil and flows over the land surface.
- SACRIFIC AREA.** A portion of the range, irrespective of site, that is intentionally overgrazed to obtain efficient overall use of the management area.
- SAPLING STAND.** An area consisting of trees the average diameter of which is between 1.0 and 4.9 inches in diameter.
- SAWTIMBER STAND.** An area consisting of trees the average size of which is above 9 inches in diameter, 4.5 feet above ground level.
- SCARIFICATION.** Disturbance of the upper soil layer by mechanical means in preparation of a site for seeding.
- SCHIST.** A medium or coarse-grained metamorphic rock with subparallel orientation of the micaceous minerals which dominate its composition.
- SEDIMENTARY ROCK.** Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.
- SEDIMENT.** Soil, rock, and organic particles carried by water.
- SEEDLING STAND.** An area consisting of trees the average diameter of which is between 0 and .9 inches in diameter.
- SEROTINOUS CONES.** The seed bearing cones of some conifers (in this area lodgepole pine) are glued together with pitch (resin) from the tree. This is called serotinous behavior, and it does not let the seeds drop until sufficient heat is applied to the cone to melt the resin and open the cone. This heat can come from either fire or the sun. The air temperature within about 4 inches of ground level is usually over 130° F in the summer time (day time) and this is sufficient to open serotinous cones.
- SILTATION.** The degree of which silt settles out of water and blankets the bottom of a stream, lake, reservoir, or pond.
- SILVICULTURE.** The establishment, development, reproduction, and care of forest trees.
- SITE PREPARATION (Prepared Seedbed).** Some tree species, including lodgepole pine in this area, need a mineral soil seedbed exposed in order to germinate the seeds that fall. To accomplish sufficient regeneration of a lodgepole pine stand, the site is scarified, normally using a dozer to push the unused wood into piles. This piling action removes the duff or decaying organic mat on top of the soil to expose the mineral soil. This can also be accomplished using prescribed fire. In this method the unusable wood, or slash, would be left in place after logging and burned in place. The fire would remove the duff and expose the mineral soil. Either of these actions sufficiently prepares the area for regeneration. The reasons that these seeds need a mineral soil seedbed is that the duff layer on top of the ground (3-6 inches in depth) dries out faster than the mineral soil. This faster drying will not allow the seeds to germinate.
- SITE QUALITY.** The potential of a particular area to grow trees. This is based on many variables, including soil depth and quality, aspect (terrain configuration in relation to the sun), nutrient and water availability, etc.
- SLASH.** The tops, limbs, and other unusable portions of trees left on an area after logging. In some logging operations, this slash may contain firewood or poles or other products usable by people other than the primary logger.
- SOIL COMPACTION.** Increasing the bulk density of soil through the compression of large voids. Reduction of the air spaces in soil can result in overland flow of water and in surface erosion. It also can significantly reduce plant vigor in the root zone.
- SOIL STERILIZATION.** A breaking down of the soil structure and destruction of nutrient and water conduction capacity, caused by extremely high intensity burning operations.
- STAGE II INTENSIVE FOREST INVENTORY.** A system devised by the U.S. Forest Service to intensively sample timber stands to calculate an estimate of the volume in a specified area of timberland. Intensity of sampling can vary. The intensity is usually one sample measurement point every 10 acres, depending on the total size of the area to be inventoried and other criteria.
- STAGNATION (Stagnated Pole Stands).** A condition possible in many tree species, but most prevalent in lodgepole pine, in which the regeneration on a cutover or burned area becomes established very thickly. This sometimes results in 10,000 or more trees per acre. When these trees get older, the competition for light, water and nutrients slows the growth rate of all the trees to a very low point. After several years of this, the trees lose the ability to grow any faster, even if they are thinned to an open spacing. This failure to respond to growth-stimulating practices is termed stagnation.
- STAND RESISTANCE (Mountain Pine Beetle).** Tree or stand resistance to attack by a beetle population is kept high as long as the trees are healthy. A healthy tree can create enough pitch flow when attacked to overwhelm a certain population of beetles. When average stand resistance is lowered by certain events, such as old age or drought conditions, the beetle population can build from an endemic state to an epidemic state and overwhelm the resistance of the trees.
- STOCKING RATE.** The area of land that has been allotted to each animal unit for the entire grazable period of the year.
- STONE CIRCLE.** Cultural resource generally interpreted to be the remains of Native American temporary habitations such as a tipi.
- STRUCTURAL DIVERSITY.** The diversity of different vertical layers of vegetation within a plant community.
- STUMPAGE.** Value of timber resources on the stump or before the tree is cut, usually expressed as a value per thousand board feet. (MBF).
- SUBLIMATION.** The direct change from a solid state to a gaseous state.
- SUSTAINED YIELD.** The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple use. It applies to the management of all renewable resources, including forage, timber, wildlife, water, recreation, and any value that can be managed for renewal and sustained productivity.
- TERTIARY.** Referring to the earlier part of the Cenozoic era, occurring from 1,000,000 to 70,000,000 years ago.
- TEST EXCAVATION.** Controlled subsurface probes to determine the extent of cultural resource deposits buried in an area.

## Glossary

**TIMBER CRUISE.** A method of sampling a forested area, much more intensively than an inventory, to establish an estimate of the volume of timber on an area, usually for sale purposes. Intensity is usually one or more sample points per acre.

**TIMBER MANAGEMENT PLAN.** A detailed activity plan designed to implement long-range forest management goals in a specific area. Such plans include timber harvest, preliminary road reconnaissance, and forest development practices.

**TIMBER PRODUCTION BASE.** Acreage included in the calculation of the allowable cut.

**TIMBER STAND.** A specified area of similar type or sized trees.

**TUFFACEOUS CLAYSTONE.** A very fine grained rock composed primarily of clay or clay-sized particles in which the major accessory are volcanic fragments or debris generally less than 4 mm in diameter.

**UNREGULATED VOLUME.** A BLM designation for inventory purposes, including timber in the resource base which has been dead for more than 5 years.

**VEGETATION CONVERSION.** Alteration of present vegetation by using fire, plowing, spraying, or other means to manipulate natural successional trends.

**VEGETATIVE MANIPULATION.** Mechanically or chemically changing the vegetation composition to obtain a desirable end result.

**VOLCANIC CONGLOMERATE.** A rock composed mainly of subangular to subrounded fragments of volcanic origin in a matrix of similar composition.

**VOLCANIC DIKE.** Formed by lava that intruded into fissures and solidified.

**VOLCANIC LACCOLITH.** Produced by the intrusion of an igneous mass between the bedding planes of rock strata so as to form a lenticular mass convex upward.

**WATERSHED.** The area drained by a stream, river, etc.

**WETLAND.** Land where water is the dominant factor determining the nature of soil development and the types of plant and animal communities existing in the soil and on its surface. Riparian areas are classified as wetlands.

**WITHDRAWAL.** An action that restricts the use of described public lands from operation of certain laws, which are also described in the withdrawal order. Withdrawal also may be used to transfer jurisdiction or management to other federal agencies.



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